# Toshiba Personal Computer

# PORTEGE R100

# Maintenance Manual

TOSHIBA CORPORATION

File Number 960-440

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Toshiba PORTEGE R100 Maintenance Manual

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# Preface

This maintenance manual describes how to perform hardware service maintenance for the Toshiba Personal Computer PORTEGE R100, referred to as PORTEGE R100 in this manual.

The procedures described in this manual are intended to help service technicians isolate faulty Field Replaceable Units (FRUs) and replace them in the field.

## SAFETY PRECAUTIONS

Four types of messages are used in this manual to bring important information to your attention. Each of these messages will be italicized and identified as shown below.

> ***DANGER:*** *"Danger" indicates the existence of a hazard that could result in death or serious bodily injury, if the safety instruction is not observed.*

> ***WARNING:*** *"Warning" indicates the existence of a hazard that could result in bodily injury, if the safety instruction is not observed.*

> ***CAUTION:*** *"Caution" indicates the existence of a hazard that could result in property damage, if the safety instruction is not observed.*

> ***NOTE:*** *"Note" contains general information that relates to your safe maintenance service.*

Improper repair of the computer may result in safety hazards. Toshiba requires service technicians and authorized dealers or service providers to ensure the following safety precautions are adhered to strictly.

- ❑ Be sure to fasten screws securely with the right screwdriver. Be sure to use the PH Point size "0" and "1" screwdrivers complying with the ISO/DIS 8764-1:1996. If a screw is not fully fastened, it could come loose, creating a danger of a short circuit, which could cause overheating, smoke or fire.

- ❑ If you replace the battery pack or RTC battery, be sure to use only the same model battery or an equivalent battery recommended by Toshiba. Installation of the wrong battery can cause the battery to explode.

The manual is divided into the following parts:

| | |
|---|---|
| Chapter 1 | Hardware Overview describes the PORTEGE R100 system unit and each FRU. |
| Chapter 2 | Troubleshooting Procedures explains how to diagnose and resolve FRU problems. |
| Chapter 3 | Test and Diagnostics describes how to perform test and diagnostic operations for maintenance service. |
| Chapter 4 | Replacement Procedures describes the removal and replacement of the FRUs. |
| Appendices | The appendices describe the following: |

- ❑ Handling the LCD module
- ❑ Board layout
- ❑ Pin assignment
- ❑ Keyboard scan/character codes
- ❑ Key layout
- ❑ Wiring diagrams
- ❑ BIOS/KBC/EC Update
- ❑ Reliability
- ❑ Key FD

## Conventions

This manual uses the following formats to describe, identify, and highlight terms and operating procedures.

### *Acronyms*

On the first appearance and whenever necessary for clarification acronyms are enclosed in parentheses following their definition. For example:

Read Only Memory (ROM)

### *Keys*

Keys are used in the text to describe many operations. The key top symbol as it appears on the keyboard is printed in **boldface** type.

### *Key operation*

Some operations require you to simultaneously use two or more keys. We identify such operations by the key top symbols separated by a plus (+) sign. For example, **Ctrl + Pause (Break)** means you must hold down **Ctrl** and at the same time press **Pause (Break)**. If three keys are used, hold down the first two and at the same time press the third.

### *User input*

Text that you are instructed to type in is shown in the boldface type below:

**DISKCOPY A: B:**

### *The display*

Text generated by the PORTEGE R100 that appears on its display is presented in the type face below:

```
Format complete
System transferred
```

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## Chapter 3 Tests and Diagnostics



## Chapter 4 Replacement Procedures

## Appendices

# Chapter 1

# Hardware Overview

# Chapter 1 Contents

## Figures



## Tables

# 1.1 Features

The PORTEGE R100 is an ultra thin and lightweight PC realizing cable-less environment on a table by wireless function with an Intel Pentium® M processor realizing high performance.

- ❑ Microprocessor

  Pentium® M

  A 900/600MHz Pentium® M processor with a 400MHz external clock, 100MHz bus and 1.2/1.05V core operation.

- ❑ Cache memory

  A Pentium® M has 32KB primary cache and 1MB secondary cache (in CPU)

- ❑ Memory

  One expansion memory module can be installed to provide a maximum of 1024MB. 128MB, 256MB and 512MB are provided for Memory.

- ❑ VRAM

  32MB VRAM in Trident XP4m.

- ❑ HDD

  40GB/30GB/20GB internal drive of 1.8-inch, 8.0mm height or 20GB internal drive of 1.8-inch, 5.0mm height.

- ❑ USB FDD

  Three-mode 3.5 inch USB FDD supporting 720KB, 1.2MB and 1.44MB formats is prepared as option.

- ❑ Display

  LCD

  Built-in 12.1 inch, 262,144 colors, XGA (1024×768 dots), thin type low temperature poly- silicon TFT color display. Video controller is included in North Bridge chip.

  CRT

  Supported via an RGB connector

- Keyboard

  Keyboards has 84(US)/85(UK)-key and supports Windows key.

- Touch pad

  Touch pad is installed as a pointing device.

- Battery

  The RTC battery is mounted inside computer.
  The main battery is a detachable lithium polymer main battery (10.8V-1,950mAh) and the RTC battery is a lithium ion battery(2.4V-15mAH).

- USB (Universal Serial Bus)

  Six USB ports supporting USB 2.0. Two of these are occupied and others are usable.

- PC card slot

  A PC card Type I or II is acceptable. Supports ToPIC-100 (3.3V/CardBus).

- SD card slot

  One SD card slot.

- Sound system

  Incorporates an internal monaural speaker, external monaural microphone connector and stereo headphone connector.

- One touch button

  Internet button and Mail button are installed.

- Built-in Modem

  The computer contains a MDC, enabling data and fax communication. It supports ITU-TV.90. The transfer rates are 56 Kbps for data reception, 33.6 Kbps for data transmission, and 14,400 bps for fax transmission. However, the actual speed depends on the line quality. The RJ11 modem jack is used to accommodate a telephone line.

- LAN

  The internal LAN supports 10/100Mbit Ethernet.

- Wireless LAN

  The internal wireless LAN supports Mini PCI Type III(802.11ab) made by Agere.

Figure 1-1 shows the front of the computer and Figure 1-2 shows the system units configuration.



*Figure 1-1 Front of the computer*

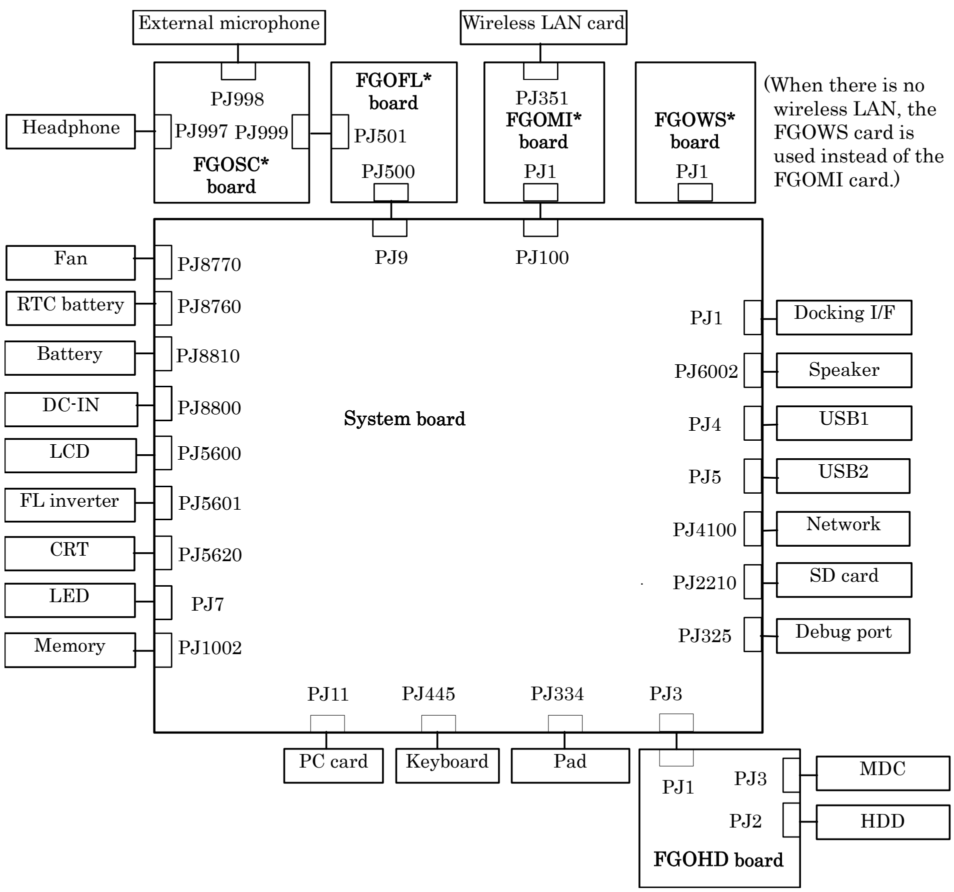



*Figure 1-2 System units configuration*

Figure 1-3 shows the system block diagram.

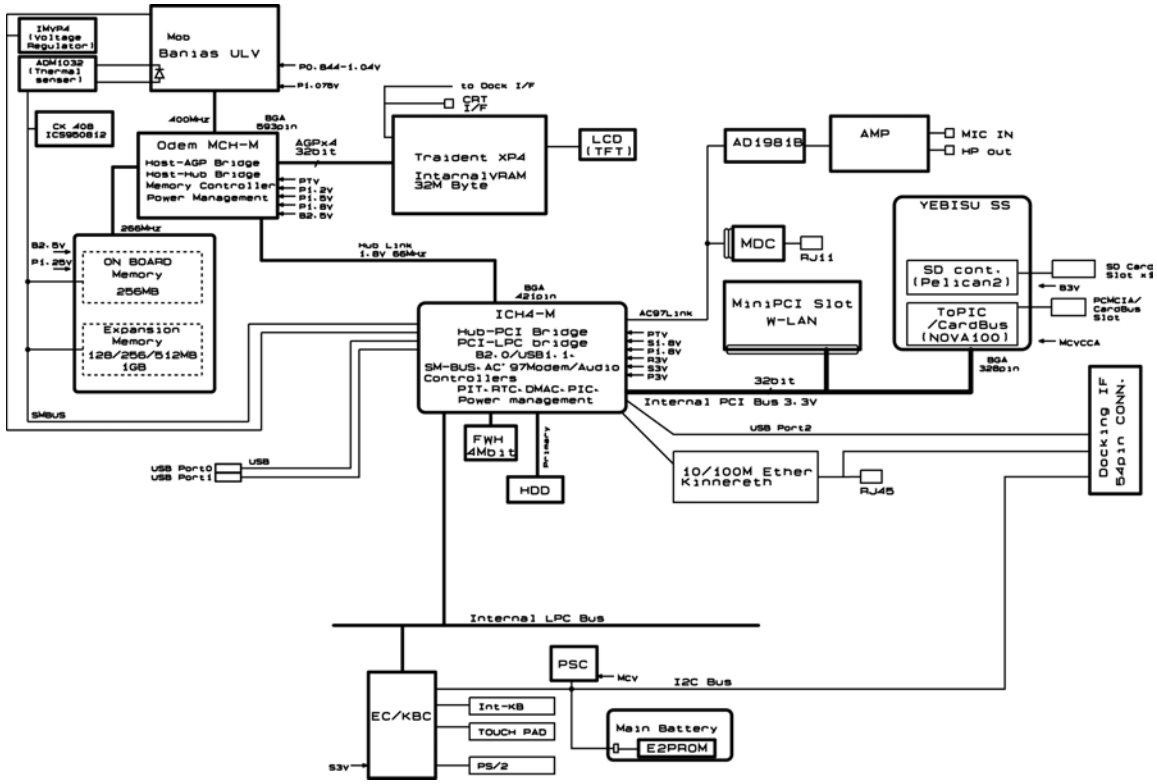



Figure 1-3 System Block Diagram

The PC contains the following components.

- ❑ CPU

  Pentium® M

  - A 900/600MHz Centrino processor with a 400MHz external clock, 100MHz bus and 1.2V/1.05 core operation voltage (built-in NDP).
  - Internal cache memory: 32KB Data and 32KB Instruction, Write-Back
  - Secondary cache memory: 1MB (in CPU)

- ❑ Memory

  One memory slot capable of accepting 256MB-memory module for a maximum of 512MB.

  - 2.5V operation
  - 140-pin exclusive memory board
  - Access time : 6ns
  - Memory Supporting PC-2100(Operation is PC100)

- ❑ BIOS ROM (Flash memory)

  - 4Mbit (256K×16-bit chip)
    - 64KB used for logo
    - 64KB used for setup and checksum
    - 128KB used for system BIOS
    - 64KB used for VGA-BIOS
    - 64KB used for ACPI
    - 8KB used for PnP
    - 8KB used for password security
    - 16KB used for booting
    - 64KB used for LAN
    - 32KB are reserved
  - 5.0V operation
  - Access time : 120 ns or 90 ns
  - Data transfer: 8-bit

- ❑ PCI chipset

  This gate array incorporates the following elements and functions

  - North Bridge (Intel-made Odem MCH-M)
    - Pentium® M processor and Mobile Northwood processor supported
    - Maximum capacity of DDR200 or DDR266 is 1GBmax
    - DRAM control
    - Complies with AGP V2.0 x 4 modes
    - Complies with PCI R2.2
    - Complies with APCI 1.0b
    - Geyserville III supported
    - Intel SpeedStep Technology supported
    - 593-ball 37.5x37.5mm Micro-FCBGA package

  - South Bridge (Intel-made ICH4-M)
    - PCI 3.3V/5V tolerance interface
    - Provides Steerable PCI interrupts for PCI device Plug-and-Play
    - Enhanced DMA controller
    - Interrupt controller
    - Counter/timers
    - Distributed DMA supported
    - PC/PCI DMA supported
    - Serial IRQ supported
    - Low Pin Count (LPC) host controller
    - Plug-and-Play supported
    - ACPI supporting features
    - Built-in PCI IDE controller
    - USB interface (6 x USB2.0 ports)
    - SMBus interface
    - Super I/O interface
    - Audio system
    - SW modem interface
    - 421-ball (31mm x 31mm) BGA package

- ❑ VGA controller

  Included in North Bridge

- ❑ PC card controller (Amkor-made YEBISU_SS)

  - PCI interface (PCI Rev.2.2)
  - Chipset interface
  - CardBus/PC Card controller (Yenta2 Ver.2.2) 1 slots
  - SD card controller (SDHC Ver.1.2)

- SDIO card controller (Ver.1.1)
- SmartMedia controller (SMHC Ver 01/SMIL1.0)
- SmartCard I/F
- SIO (UART) controller (MS Debug Port Specification Ver.1.0)
- Docking station interface
- External device interface
- 1.0mm pitch 256pin/17mm PBGA package

❑ Other main system chips

- EC/KBC (Mitsubishi-made LPC microcontroller M306K5F8LRP x 1)
- PSC (TMP87PM48U x 1)
- Temperature sensor (ADM1032 x 1)
- $E^2$PROM (BR93LC46F-Q (used for LAN MAC address))

❑ Modem controller

Supported by MDC. Using of the secondary AC97 Line

❑ LAN controller (Kinnereth-made Intel:82550PM)

Controls LAN and supports 10/100Base-T.

## 1.2 1.8-inch Hard Disk Drive

A compact, high-capacity HDD with a height of 5.0/8.0mm. Contains a 1.8-inch magnetic disk and magnetic heads.

Figure 1-4 shows a view of the 1.8-inch HDD and Tables 1-1 and 1-2 list the specifications.

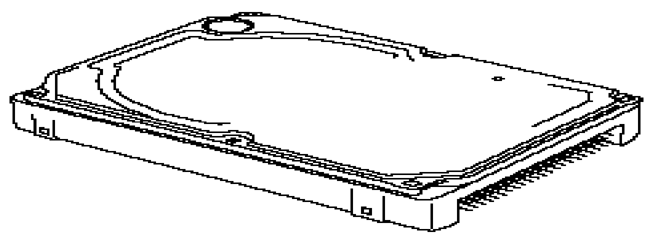


*Figure 1-4 1.8-inch HDD*

*Table 1-1 1.8-inch HDD dimensions*

| **Parameter** | | **Standard value** | | | |
|---|---|---|---|---|---|
| | | **TOSHIBA HDD1422** | **TOSHIBA MK2003GAH** | **TOSHIBA HDD1384** | **TOSHIBA HDD1524** |
| Outline dimensions | Width (mm) | 54.0 | 54.0 | 54.0 0.2 | 54.0 0.2 |
| | Height (mm) | 5.0 0.15 | 8.0 | 8.0 0.15 | 8.0 0.15 |
| | Depth (mm) | 78.5 0.3 | 78.5 | 78.5 0.3 | 78.5 0.3 |
| | Weight (g) | 51max | 62max | 62max | 62max |

*Table 1-2 1.8-inch HDD Specifications*

| Parameter | Specification | | | |
|---|---|---|---|---|
| | TOSHIBA HDD1422 | TOSHIBA MK2003GAH | TOSHIBA HDD1384 | TOSHIBA HDD1524 |
| Storage size (formatted) | 20GB | 20GB | 30GB | 40GB |
| Speed (RPM) | 4,200 0.1 | 4,200 | 4,200 | 4,200 0.1 |
| Data transfer speed (Mbits/s) | 125.5 to 253.1 | 115.6 to 204.4 | 114.8 to 222.7 | 125.5 to 253.1 |
| Interface transfer rate (MB/s) | 100 | 100 | 100 | 100 |
| Track density | | | | |
| Track/mm(TPI) | 3465 | 2237 (56.8K) max. | 3039 | 3465 |
| Bit/mm | 27.4K | 24.4K(621K) max. | 24.1K | 27.4K |
| Access time (msec) | | | | |
| Track to track | 3 | 3 | 3 | 3 |
| Average time | 15 | 15 | 15 | 15 |
| Max seek | 26 | 26 | 26 | 26 |
| Start time (sec) | 3.5 typical<br>20 max | 3.5 typical<br>20 max | 3.5 typical<br>20 max | 3.5 typical<br>20 max |

## 1.3 Keyboard

The keyboard is mounted 84(US)/85(UK) keys that consist of character key and control key, and in conformity with JIS. The keyboard is connected to membrane connector on the system board and controlled by the keyboard controller. See Appendix E about a layout of the keyboard.

## 1.4 TFT Color Display

The TFT color display consists of a LCD module and FL inverter board.

### 1.4.1 LCD Module

The LCD module used for the TFT color display uses a backlight as the light source and can display images and characters of 262,144 colors with 1024×768 resolution. The video controller is incorporated into the North Bridge (M1644M) chip and can control both internal and external XGA-support displays simultaneously.

Table 1-5 shows list the specifications.

*Table 1-3 LCD module specifications (12.1 TFT)*

| Item | Specifications |
|---|---|
| | G33C0000U |
| Number of Dots | 1024×768 |
| Dot spacing (mm) | 0.24(H) x 0.24(V) |
| Display range (mm) | 245.76(H) x 184.32(V) |
| Outline dimensions | 264.4(w) x 197.5(H) x 5.35Max(D) |

### 1.4.2 FL Inverter Board

The FL inverter board supplies a high frequency current to illuminate the LCD module FL.

Table 1-4 lists the FL inverter board specifications.

*Table 1-4 FL inverter board specifications*

| **Item** | **Specifications** | |
|---|---|---|
| | **UA2040P02** | |
| Input | Voltage (V) | DC 5 |
| Output | Voltage (V) | 750 |
| | Current MAX (mA) | 4.22 |
| | Current MIN (mA) | 0.412 |

# 1.5 Power Supply

The power supply supplies eight different voltages to the system board.

The power supply microcontroller has the following functions.

1. Judges that the DC power supply (AC adapter) is connected to the computer.
2. Detects DC output and circuit malfunctions.
3. Controls the battery icon, and DC IN icon.
4. Turns the battery charging system on and off and detects a fully charged battery.
5. Turns the power supply on and off.
6. Provides more accurate detection of a low battery.
7. Calculates the remaining battery capacity.
8. Controls the transmission of the status signal of the main battery.

Table 1-5 lists the power supply output specifications.

*Table 1-5 Power supply output specifications*

| Device | Name | DC Voltage (V) |
|---|---|---|
| CPU | PPV | 1.000 - 0.748 |
| MCH-M | MCH1R2-P1V | 1.2 |
| CPU,MCH-M,ICH4-M | PTV | 1.075 |
| GPU | 2R5-P2V | 2.5 |
| MCH-M,SDRAM | 2R5-B2V | 2.5 |
| SDRAM | 1R25-B1V (1R25M-B1V) | 1.25 |
| GPU | PGV | 1.2-1.5 |
| ICH4-M,KINNERETH | LAN-E3V | 3.3 |
| ICH4-M,EC/KBC | S3V | 3.3 |
| YEBISUSS,PC Card,MDC | B3V | 3.3 |
| Clock Generator,ADM1032,ICH4-M,FWH,Mini PCI, GPU,LCD,AD1981B,HDD | P3V | 3.3 |

| Device | Name | DC Voltage (V) |
|---|---|---|
| SD | SD-B3V | 3.3 |
| USB | E5V | 5 |
| PC Card | B5V | 5 |
| KB,LED,FL INVERTER | P5V | 5 |
| DOCK | D-E3V | 3.3 |
| DOCK | D-E5V | 5 |
| AD1981B | A4R7-P4V | 4.7 |
| Headphone,Ext-Mic | A-P3V | 3.3 |
| CPU,MCH-M,ICH4-M | 1R8-P1V | 1.8 |
| MCH-M,ICH4-M,GPU | 1R5-P1V | 1.5 |
| ICH4-M | 1R5-S1V | 1.5 |
| ICH4-M | LAN1R5-E1V | 1.5 |
| MAX6501,LED | M5V | 5 |
| ICH4-M,EC/KBC | S5V | 5 |
| PSC | MCV | 5 |
| AD1981B,MIC | A4R7-P4V | 4.7 |
| ICH4-M | R3V | 2.0 - 3.3 |

# 1.6 Batteries

The PC has the following two batteries.

❑ Main battery
❑ Real time clock (RTC) battery

Table 1-6 lists the specifications for these two batteries.

*Table 1-6 Battery specifications*

| Battery Name | Battery Element | Output Voltage | Capacity |
|---|---|---|---|
| Main battery (XM2043P02) | Lithium ion | 10.8V | 1600mAh |
| Real time clock (RTC) battery | Nickel hydride | 2.4 V | 15 mAh |

## 1.6.1 Main Battery

The main battery is the primary power supply for the computer when the AC adapter is not connected. In resume (instant recovery) mode, the main battery maintains the current status of the computer.

### 1.6.2 Battery Charging Control

Battery charging is controlled by a power supply microprocessor. The power supply microprocessor controls power supply and detects a full charge when the AC adaptor and battery are connected to the computer. The system charges the battery using quick charge or trickle charge.

- Quick Battery Charge

  When the AC adapter is connected, normal charging is used while the system is turned on and quick charge is used while the system is turned off or in suspend mode. (See Table 1-7)

*Table 1-7 Time required for charges of main battery*

| | Charging Time |
|---|---|
| Normal charge | About 2 to 4 hours |
| Quick charge | About 2 hours |

Quick battery charge is stopped in the following cases.

1. The main battery is fully charged
2. The main battery is removed
3. Main battery or AC adapter voltage is abnormal
4. Charging current is abnormal

- Trickle charge

  When the main battery is fully charged and the AC adapter is plugged in, the power supply microcontroller automatically switches from quick charge to trickle charge.

### 1.6.3 RTC Battery

The RTC battery provides the power supply to maintain the date, time, and other system information in memory. Table 1-8 lists the battery charging time and data preservation times.

*Table 1-8 RTC battery charging/data preservation time*

| | | Time |
|---|---|---|
| Charging | AC adapter or main battery in use | 8 hours (approx.) |
| Data preservation time (when fully charged) | | 1 month |

## 1.7 AC Adapter

The AC adapter is also used to charge the battery.

Table 1-9 lists the AC adapter specifications.

*Table 1-9 AC adapter specifications*

| Parameter | Specification |
|---|---|
| Input voltage | AC 100 to 240V |
| Input frequency | 50Hz/60Hz |
| Input current(MAX) | 1.2A (100VAC) |
| Output voltage | DC 15V |
| Output current | 3.0A |

# Chapter 2

# Troubleshooting Procedures

# Chapter 2 Contents

## Figures



## Tables

## 2.1 Troubleshooting

Chapter 2 describes how to determine which Field Replaceable Unit (FRU) in the computer is causing the computer to malfunction. (The "FRU" means the replaceable unit in the field.) The FRUs covered are:

1. Power supply
2. System board
3. 3.5" USB FDD
4. 1.8" HDD
5. Keyboard
6. Display
7. Touch pad
8. Modem
9. LAN
10. Sound
11. SD card slot
12. Wireless LAN

The Detailed replacement procedures are given in Chapter 4. Test Program operations are described in Chapter 3.

The following tools are necessary for implementing the Diagnostics procedures:

1. Diagnostics Disk (Test program for maintenance)
2. Phillips screwdrivers

> ***NOTE:*** *Be sure to use the PH point size "0" screwdriver complying with the ISO/DIS 8764-1:1996.*

3. Toshiba MS-DOS system FD
4. Work disk (for FDD testing)
5. Cleaning disk kit (for FDD head cleaning)
6. A set of tools for debug port test (test cable, test board, RS-232C cross cable, display, D port FD)
7. PC with a serial port (for displaying debug port test result)
8. Wraparound connector for PC card
9. Tester
10. External CRT
11. External USB Keyboard
12. External USB mouse
13. Headphone
14. Microphone
15. LAN wraparound connector

## 2.2 Troubleshooting Flowchart

Use the flowchart in Figure 2-1 as a guide for determining which FRU malfunctions. Before going through the flowchart steps, check the following:

- ❑ Make sure that Toshiba Windows® XP is installed on the hard disk. Non-Toshiba operating systems can cause the computer malfunction.
- ❑ Make sure all optional equipment is removed from the computer.
- ❑ Make sure the USB FDD is empty.

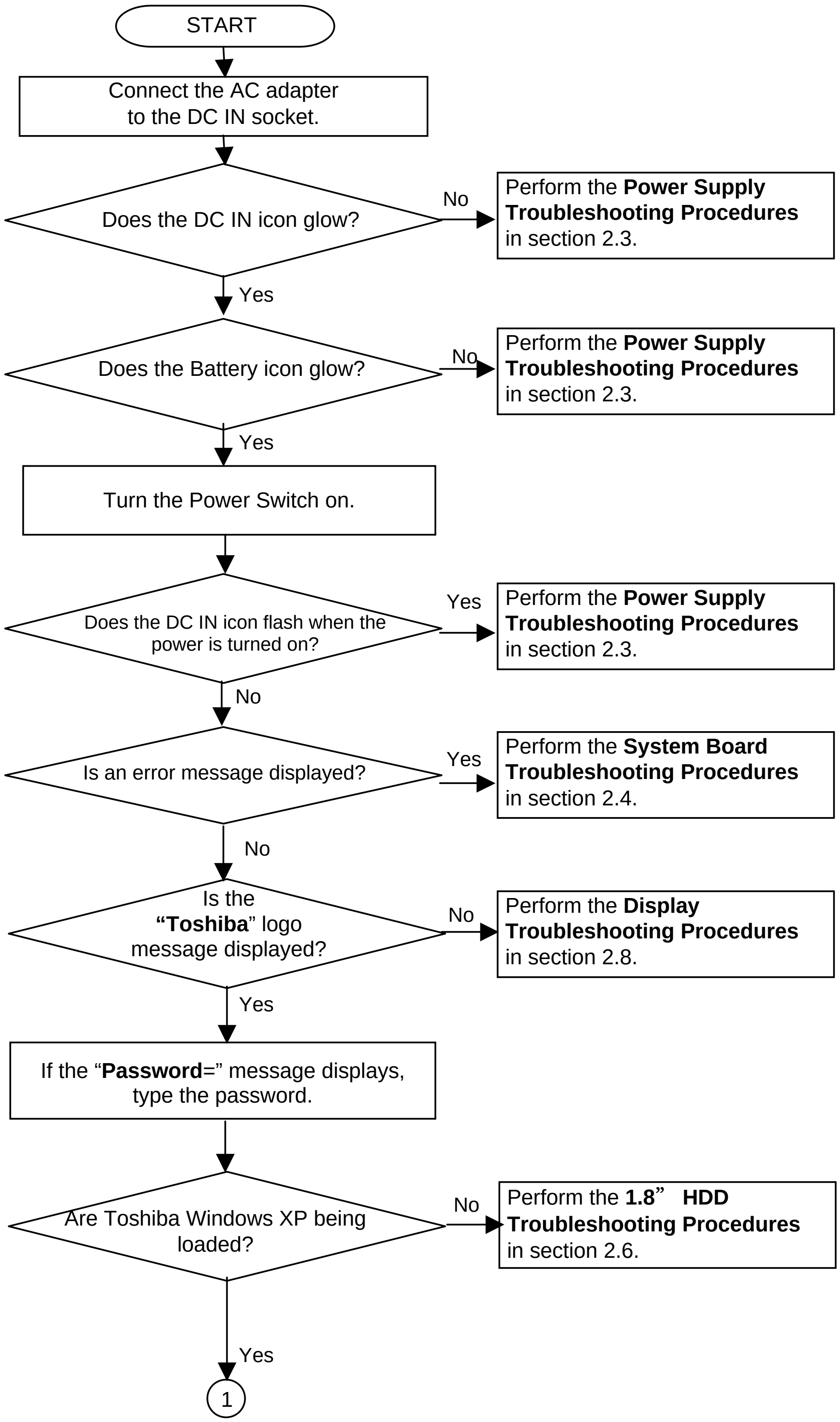



*Figure 2-1 Troubleshooting flowchart (1/2)*

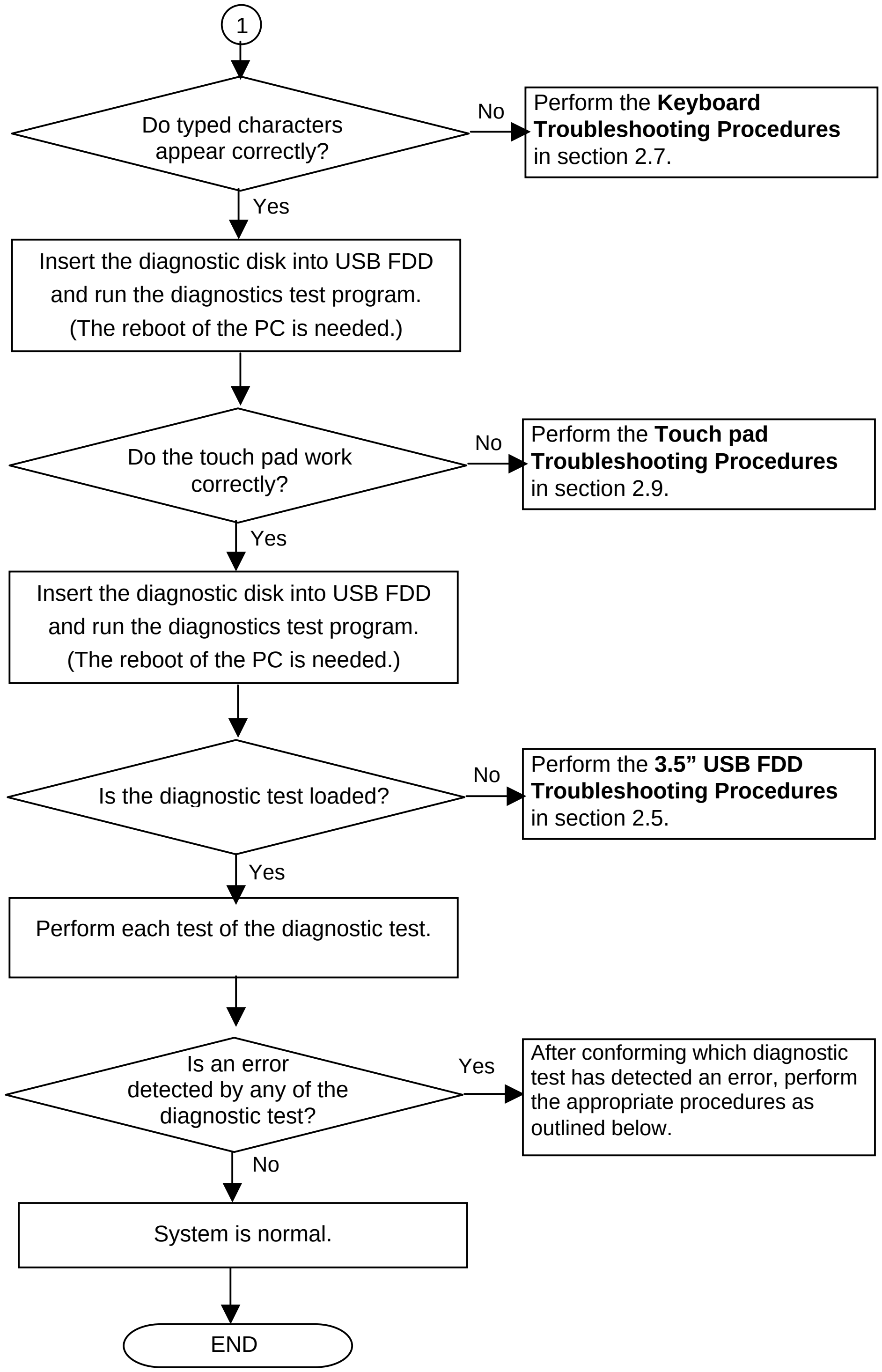



*Figure 2-2 Troubleshooting flowchart (2/2)*

If the diagnostics program cannot detect an error, the problem may be intermittent. The Test program should be executed several times to isolate the problem. Check the Log Utilities function to confirm which diagnostic test detected an error(s), then perform the appropriate troubleshooting procedures as follows:

1. If an error is detected on the system test, memory test, display test, Expansion test, Real timer test or Sound/LAN/modem test, perform the System board Troubleshooting Procedures in Section 2.4.

2. If an error is detected on the floppy disk test, perform the USB FDD Troubleshooting Procedures in Section 2.5.

3. If an error is detected on the hard disk test, perform the HDD Troubleshooting Procedures in Section 2.6.

4. If an error is detected on the keyboard test, perform the Keyboard Troubleshooting Procedures in Section 2.7.

5. If an error is detected on the display test, perform the Display Troubleshooting Procedures in Section 2.8.

## 2.3 Power Supply Troubleshooting

The power supply controller controls many functions and components. To determine if the power supply is functioning properly, start with Procedure 1 and continue with the other Procedures as instructed. The procedures described in this section are:

Procedure 1: Power supply icon Check

Procedure 2: Error Code Check

Procedure 3: Connection Check

Procedure 4: Quick Charge Check

Procedure 5: Replacement Check

## Procedure 1 Power supply icon Check

The following two icons indicate the power supply status:

- Battery icon
- DC IN icon

The power supply controller uses the power supply status with the Battery icon and the DC IN icon as listed in the tables below.

*Table 2-1 Battery icon*

| **Battery icon** | **Power supply status** |
|---|---|
| Lights orange | Battery is charged and the external DC is input. It has no relation with ON/OFF of the system power. |
| Lights green | Battery is fully charged and the external DC is input. It has no relation with ON/OFF of the system power. |
| Blinks orange (even intervals) | The battery level is low while the system power is ON. |
| Flashes orange | The battery level is low and the power switch is pressed on in the battery driving. |
| Doesn't light | Any condition other than those above. |

*Table 2-2 DC IN* icon

| **DC IN icon** | **Power supply status** |
|---|---|
| Lights green | DC power is being supplied from the AC adapter. |
| Blinks orange | Power supply malfunction* 3 |
| Doesn't light | Any condition other than those above. |

*3 When the power supply controller detects a malfunction, the DC IN icon blinks orange. It shows an error code.

When icons are blinking, perform the following procedure.

1. Remove the battery pack and the AC adapter and cut off the power supply to the computer by force.
2. Re-attach the battery pack and the AC adapter.

If icon s are still blinking after the operation above, check the followings:

Check 1 If the DC IN icon blinks orange, go to Procedure 2.

Check 2 If the DC IN icon does not light, go to Procedure 3.

Check 3 If the battery icon does not light orange or green, go to Procedure 4.

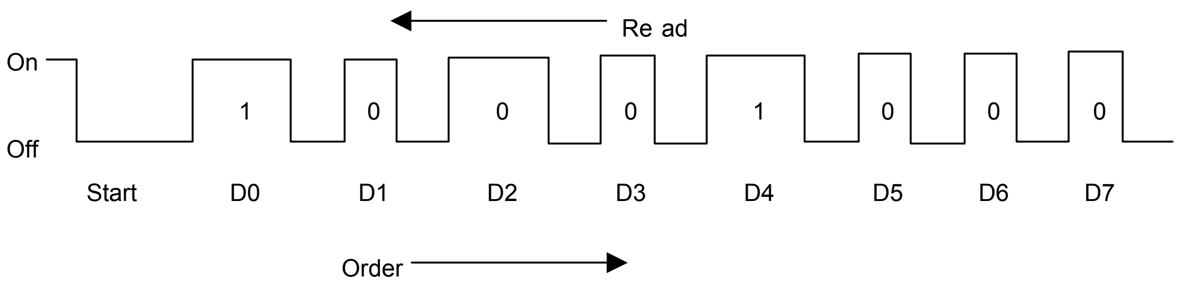
> ***CAUTION**: Use a recommended AC adapter (ADP-45W) only.*

## Procedure 2 Error Code Check

If the power supply microprocessor detects a malfunction, the DC IN icon blinks orange. The blink pattern indicates an error as shown below.

- ❑ Start — Off for 2 seconds
- ❑ Error code (8 bit)
  - "1" — On for one second
  - "0" — On for half second
  - Interval between data bits — On for half second

The error code begins with LSB (Least Significant bit)
Example: Error code 11h (Error codes are given in hexadecimal format.)




Check 1 Convert the DC IN icon blink pattern into the hexadecimal error code and compare it to the tables below. Then go to Check 2.

❑ DC power supply (AC adapter)

| Error code | Meaning |
|---|---|
| 10h | AC Adapter output voltage is over 16.5V. |
| 11h | Commondock output voltage is over 16.5V. |
| 12h | Current from the DC power supply is over 4.95A. |
| 13h | Current from the DC power supply is over 0.5A when there is no load. |
| 14h | Abnormal current has been sensed 0[A]. |

❑ Main Battery

| Error code | Meaning |
|---|---|
| 20h | Over voltage is detected. |
| 21h | Main battery charge current is over 4.95A. |
| 22h | Main battery discharge current is over 0.5A when there is no load. |
| 23h | Main battery charge current is over 2.3A. |
| 24h | Abnormal current has been sensed 0[A]. |
| 25h | Main battery charge current is over 0.3A. |

❑ Second Battery

| Error code | Meaning |
|---|---|
| 30h | Over voltage is detected. |
| 31h | Main battery charge current is over 4.95A. |
| 32h | Main battery discharge current is over 0.5A when there is no load. |
| 33h | Main battery charge current is over 2.3A. |
| 34h | Abnormal current has been sensed 0[A]. |
| 35h | Main battery charge current is over 0.3A. |

❑ S3V output

| Error code | Meaning |
|---|---|
| 40h | S3V voltage is 3.14V or less when the computer is powered on/off. |
| 45h | S3V voltage is 3.14V or less at power-on (CV support) |

❑ 1R5-C1 output

| Error code | Meaning |
|---|---|
| 50h | 1R5-C1 voltage is over 1.80V when the computer is powered on/off. |
| 51h | 1R5-C1 voltage is 1.275V or less when the computer is powered on. |
| 52h | 1R5-C1 voltage is 1.275V or less when the computer is booting up. |
| 53h | 1R5-C1 voltage is 1.275V or less while the computer is suspended. |
| 54h | 1R5-C1 voltage is abnormal during shutdown (CV support) |
| 55h | 1R5-C1 voltage is 1.275V or less at power-on (CV support) |

❑ 1R8-C1 output

| Error code | Meaning |
|---|---|
| 60h | 1R8-C1V voltage is over 2.16V when the computer is powered on/off. |
| 61h | 1R8-C1V voltage is 1.53V or less when the computer is powered on. |
| 62h | 1R8-C1V voltage is 1.53V or less when the computer is booting up. |
| 63h | 1R8-C1V voltage is 1.53V or less while the computer is suspended. |
| 64h | 1R8-C1V voltage is abnormal during shutdown (CV support) |
| 65h | 1R8-C1V voltage is 1.53V or less at power-on (CV support) |

- PPV output

| Error code | Meaning |
|---|---|
| 70h | PPV voltage is over 1.80V when the computer is powered on/off. |
| 71h | PPV voltage is 0.56V or less when the computer is powered on. |
| 72h | PPV voltage is 0.56V or less when the computer is booting up. |
| 73h | PPV voltage is 0.56V or more when the computer is powered off. |

- PGV output

| Error code | Meaning |
|---|---|
| 80h | PGV voltage is over 1.92V when the computer is powered on/off. |
| 81h | PGV voltage is 0.68V or less when the computer is powered on. |
| 82h | PGV voltage is 0.68V or less when the computer is booting up. |
| 83h | PGV voltage is 0.68V or more when the computer is powered off. |

- E5V output

| Error code | Meaning |
|---|---|
| 90h | E5V voltage is over 6.00V when the computer is powered on. |
| 91h | E5V voltage is 4.50V or less when the computer is powered on. |
| 92h | E5V voltage is 4.50V or less when the computer is booting up. |
| 93h | E5V voltage is 4.50V or less when the computer is powered off. |
| 94h | E5V voltage is 4.50V or less while the computer is suspended. |

- E3V output

| Error code | Meaning |
|---|---|
| A0h | E3V voltage is over 3.96V when the computer is powered on. |
| A1h | E3V voltage is 2.81V or less when the computer is powered on. |
| A2h | E3V voltage is 2.81V or less when the computer is booting up. |
| A3h | E3V voltage is 2.81V or less when the computer is powered off. |
| A4h | E3V voltage is 2.81V or less while the computer is suspended. |

❑ 1R2-P1V output

| Error code | Meaning |
|---|---|
| B0h | 1R2-P1V voltage is over 1.44V when the computer is powered on. |
| B1h | 1R2-P1V voltage is 1.02V or less when the computer is powered on. |
| B2h | 1R2-P1V voltage is 1.02V or less when the computer is booting up. |
| B3h | 1R2-P1V voltage is 1.02V or less when the computer is powered off. |
| B4h | 1R2-P1V voltage is 1.02V or less while the computer is suspended. |

❑ PTV output

| Error code | Meaning |
|---|---|
| C0h | PTV voltage is over 1.426V when the computer is powered on. |
| C1h | PTV voltage is 0.89V or less when the computer is powered on. |
| C2h | PTV voltage is 0.89V or less when the computer is booting up. |
| C3h | PTV voltage is 0.89V or less when the computer is powered off. |
| C4h | PTV voltage is 0.89V or less while the computer is suspended. |

❑ 1R25-B1V output

| Error code | Meaning |
|---|---|
| D0h | 1R25-B1V voltage is over 1.50V when the computer is powered on. |
| D1h | 1R25-B1V voltage is 1.063V or less when the computer is powered on. |
| D2h | 1R25-B1V voltage is 1.063V or less when the computer is booting up. |
| D3h | 1R25-B1V voltage is 1.063V or less when the computer is powered off. |
| D4h | 1R25-B1V voltage is 1.063V or less while the computer is suspended. |

❑ 2R5-B2V output

| Error code | Meaning |
|---|---|
| E0h | 2R5-B2V voltage is over 3.00V when the computer is powered on. |
| E1h | 2R5-B2V voltage is 2.125V or less when the computer is powered on. |
| E2h | 2R5-B2V voltage is 2.125V or less when the computer is booting up. |
| E3h | 2R5-B2V voltage is 2.125V or less when the computer is powered off. |
| E4h | 2R5-B2V voltage is 2.125V or less while the computer is suspended. |

Check 2 In the case of error code 10h or 12h:

- ❑ Make sure the AC adapter and AC power cord are firmly plugged into the DC IN 15 V socket and wall outlet. If the cables are connected correctly, go to the following step:
- ❑ Connect a new AC adapter and AC power cord. If the error still exists, go to Procedure 5.

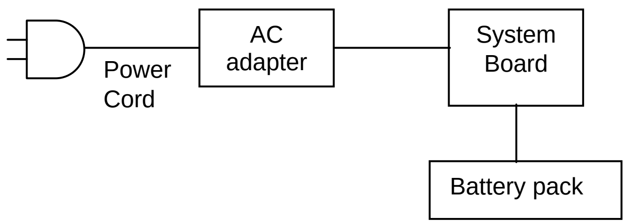
Check 3 In the case of error code 21h:

- ❑ Go to Procedure 3.

Check 4 For any other errors, go to Procedure 5.

## Procedure 3 Connection Check

The wiring diagram related to the power supply is shown below:




Any of the connectors may be disconnected. Perform starting from Check 1.

Check 1 Make sure the AC adapter and the AC power cord are firmly plugged into the DC IN 15 V socket and wall outlet. If these cables are connected correctly, go to Check 2.

Check 2 Replace the AC adapter and the AC power cord with new ones.

- If the DC IN icon does not light, go to Procedure 5.
- If the battery icon does not light, go to Check 3.

Check 3 Make sure the battery pack is installed in the computer correctly. If the battery is properly installed and the battery icon still does not light, go to Procedure 4.

## Procedure 4 Quick Charge Check

Check if the power supply controller charges the battery pack properly. Perform the following procedures:

Check 1 Make sure the AC adapter is firmly plugged into the DC IN socket.

Check 2 Make sure the battery pack is properly installed. If the battery is properly installed, go to Check 3.

Check 3 The battery pack may be completely discharged. Wait a few minutes to charge the battery pack while connecting the battery pack and the AC adapter. If the battery pack is still not charged, go to Check 4.

Check 4 The battery's temperature is too high or low. Return the temperature to normal operating condition. If the battery pack is still not charged, go to Check 5.

Check 5 Replace the battery pack with a new one. If the battery pack is still not charged, go to Procedure 5.

## Procedure 5 Replacement Check

The power is supplied to the System board by the AC adapter. If either the AC adapter or the System board was damaged, perform the following Checks.

To disassemble the computer, follow the steps described in Chapter 4.

Check 1 Replace the AC adapter with a new one. If the AC adapter is still not functioning properly, perform Check 2.

Check 2 Replace the System board with a new one.

## 2.4 System board Troubleshooting

This section describes how to determine if the System board is defective. Start with Procedure 1 and continue with the other procedures as instructed. The procedures described in this section are:

Procedure 1: Message Check

Procedure 2: Debug port (D port) Check on Boot Mode

Procedure 3: Diagnostic Test Program Execution Check

Procedure 4: Replacement Check

### Procedure 1 Message Check

When the power is turned on, the system performs the Initial Reliability Test (IRT) installed in the BIOS ROM. The IRT tests each IC on the System board and initializes it.

- ❑ If an error message is shown on the display, perform Check 1.
- ❑ If there is no error message, go to Procedure 2.
- ❑ If MS-DOS or Windows® XP is properly loaded, go to Procedure 4.

Check 1 If one of the following error messages is displayed on the screen, press the **F1** key as the message instructs. These errors occur when the system configuration preserved in the RTC memory (CMOS type memory) is not the same as the actual configuration or when the data is lost.

If you press the **F1** key as the message instructs, the SETUP screen appears to set the system configuration. If error message (b) appears often when the power is turned on, replace the RTC battery. If any other error message is displayed, perform Check 2.

```
(a)     *** Bad HDD type ***
        Check system.  Then press [F1] key ......
(b)     *** Bad RTC battery ***
        Check system.  Then press [F1] key ......
(c)     *** Bad configuration ***
        Check system.  Then press [F1] key ......
(d)     *** Bad memory size ***
        Check system.  Then press [F1] key ......
(e)     *** Bad time function ***
        Check system.  Then press [F1] key ......
(f)     *** Bad check sum (CMOS) ***
        Check system.  Then press [F1] key ......
(g)     *** Bad check sum (ROM) ***
        Check system.  Then press [F1] key ......
```

Check 2 If the following error message is displayed on the screen press any key as the message instructs.
The following error message appears when data stored in RAM under the resume function is lost because the battery has become discharged or the System board is damaged. Go to Procedure 3.

```
WARNING:  RESUME FAILURE.
PRESS ANY KEY TO CONTINUE.
```

If any other error message is displayed, perform Check 3.

Check 3 The IRT checks the System board. When the IRT detects an error, the system stops or an error message appears.

If one of the following error messages (1) through (17), (24) or (25) is displayed, go to Procedure 5.

If error message (18) is displayed, go to the Keyboard Troubleshooting Procedures in Section 2.7.

If error message (19), (20) or (21) is displayed, go to the 1.8” HDD Troubleshooting Procedures in Section 2.6.

If error message (22) or (23) is displayed, go to the 3.5” USB FDD Troubleshooting Procedures in Section 2.5.

(1) PIT ERROR
(2) MEMORY REFRESH ERROR
(3) TIMER CH.2 OUT ERROR
(4) CMOS CHECKSUM ERROR
(5) CMOS BAD BATTERY ERROR
(6) FIRST 64KB MEMORY ERROR
(7) FIRST 64KB MEMORY PARITY ERROR
(8) VRAM ERROR
(9) SYSTEM MEMORY ERROR
(10) SYSTEM MEMORY PARITY ERROR
(11) EXTENDED MEMORY ERROR
(12) EXTENDED MEMORY PARITY ERROR
(13) DMA PAGE REGISTER ERROR
(14) DMAC #1 ERROR
(15) DMAC #2 ERROR
(16) PIC #1 ERROR
(17) PIC #2 ERROR
(18) KBC ERROR
(19) HDC ERROR
(20) HDD #0 ERROR
(21) HDD #1 ERROR
(22) NO FDD ERROR
(23) FDC ERROR
(24) TIMER INTERRUPT ERROR
(25) RTC UPDATE ERROR

## Procedure 2 Debug Port Check on Boot Mode

Check the D port status by a debug port test. The tool for debug port test is shown below.

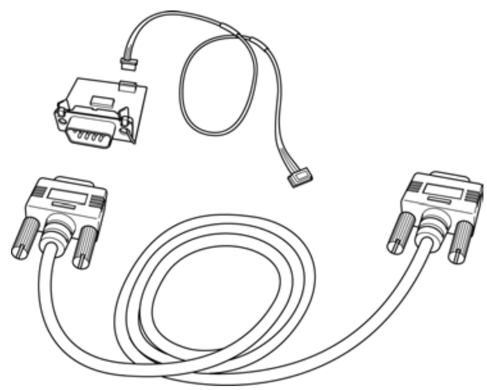
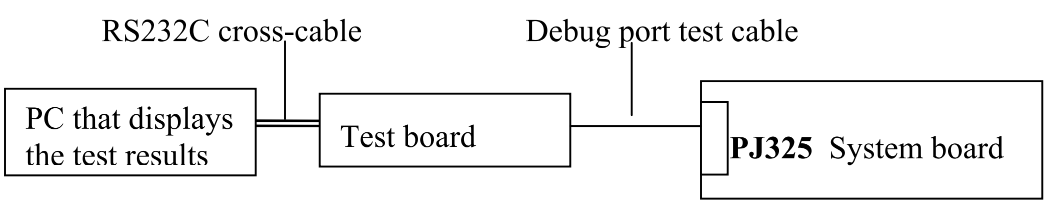


*Figure 2-3 A set of tool for debug port test*

The test procedures are follows;

1. Connect the debug test cable to the connector PJ325 of the System board. For disassembling to connect the test cable, refer to Chapter 4.
2. Connect the debug port test cable and RS-232C cross-cable to the test board.
3. Connect the RS-232C cross-cable to the PC that displays the results.




4. Boot the computer in MS-DOS mode.

5. Execute GETDPORT.COM in the text menu in CPU REAL mode. (Insert the FD for starting D port into FDD and input “FD starting drive:>dport”.)
   The D port status is displayed in the following form;

   F100 : 000.000382 IRT_CHK_INI\SYSI_START

   | F100 | 000.000382 | IRT_CHK_INI\SYSI_START |
   |---|---|---|
   | D port status | Time (second) to process | Contents of process |

6. When the D port status is FFFFh (normal status), go to Procedure 3
7. When the D port status falls into any status in Table 2-3, execute Check 1.

*Table 2-3 D port status (1/6)*

| D port status | Inspection items | details |
|---|---|---|
| F000h | Start | Clearing a software reset bit |
| | | Enabling address line A20 |
| | | Initializing special registers and Intel chipset |
| | | Initializing the CH0 of a PIT |
| | | Initializing flags determining whether BIOS is rewritten |
| | CHECK SUM CHECK | CHECK SUM CHECK |
| | | Switching to protected mode |
| | | Examining the checksum of Boot Block |
| | | Examining the checksum of other data in a flash memory |
| F001h | Initializing a KBC (1) | Checking if EC/KBC firmware is to be rewritten |
| | | Initializing a KBC |
| | | Sending command bytes |
| | | Sending scan enable command |
| | Checking F12 key-in | Checking F12 key-in |
| F002h | | Initializing a security controller |
| F005h | Checking whether BIOS rewrite is requested | Checking whether BIOS rewrite is requested |
| F006H | Checking BIOS signature | Checking BIOS signature |
| F007h | Rewriting BIOS | Initializing HW |
| | | Initializing GPIO I/O space |
| | | Enabling BIOS writing |
| | | Serial interrupt control |
| | | Disabling BIOS write protection |
| | | Enabling SMBus I/O space |
| | | Enabling SMBus access |
| | | Configuring DRAM |
| | | Enabling L1 cache memory |
| | | Clearing memory |
| | | Disabling cache |
| | | Initializing special registers |
| F008h | | Changing ROM BIOS to RAM BIOS |
| F009h | | Storing key scan code |
| | | Setting up TASK_1ms_TSC |
| | | Displaying message on navipanel (EC/KBC UPDATE, BIOS UPDATA/DAMAGED) |

*Table 2-3 D port status (2/6)*

| D port status | Inspection items | details |
|---|---|---|
| **F009h** | | **Key inputting** |
| | Executing CHGBIOSA | Loading CHGBIOSA.EXE and CHGFIRMA.EXE |
| | | Resetting FDC |
| | | Setting parameter for 2HD and transmission rate |
| | | Reading the first sector |
| | | Setting parameter for 2DD and transmission rate |
| | | Searching CHGBIOSA.EXE in the root director |
| | | Calculating head and sector to start |
| | | Reading contents of root directory by one sector |
| | | Searching “CHGBIOSA.EXE”/ “CHGFIRMA.EXE” entry in the sector |
| | | Reading EXE header of “CHGBIOSA.EXE”/ “CHGFIRMA.EXE” |
| | | Executing CHGBIOSA.EXE and CHGFIRMA.EXE |
| F100h | | Initializing the Ch1 of a PIT(Refresh interval→30 μ s) |
| F101h | Checking the size and type of DRAM<br>Testing the stack area of SMRAM | Checking the size and type of DRAM( on Cold Booting) |
| | | Checking the size of DRAM |
| | | Testing the stack area of SMRAM |
| F102h | Checking and initializing CMOS | Configuring cache memory |
| | | Enabling L1 cache memory |
| | | Testing CMOS for access ( on Cold Booting) |
| | | Checking the voltage of a CMOS backup battery |
| | | Examining the checksum of CMOS |
| | | Initializing data in CMOS (1) |
| | | Setting up IRT status |
| | | Storing the size of DRAM |
| F103h | Checking for branch of resuming<br>Copying the contents of ROM to RAM | Checking for branch of resuming |
| | | ICH4-M Power Failure |
| | | Examining the checksum of SMRAM |
| | | Checking whether the memory configuration have been changed |
| | | Examining the checksum of system BIOS RAM area |
| | | Conducting resuming |
| | | Disabling all SMIs |

*Table 2-3 D port status (3/6)*

| D port status | Inspection items | details |
|---|---|---|
| F103 | | Clearing resuming status |
| | | Setting a request for a resuming error |
| | | Copying system BIOS from ROM to RAM |
| F104h | Initializing SMRAM | Initializing SMRAM |
| | | Checking the factor of WakeUp |
| | | Changing SMRAM base |
| | | Enabling SMI |
| F106h | Initializing a PIT and a CPU | Initializing devices before initializing PCI bus |
| | | Testing(only on COLD booting) and Initializing PIT |
| | | Setting test pattern to channel 0 of PIT#0 |
| | | Checking whether the test pattern ca be read |
| | | Initializing PIT channel 0 (Interval of time interrupt→55ms) |
| | | Initializing PIT channel 2 (frequency for sound generator→664ms) |
| | | Testing PIT channel 1(Checks whether the refresh signal operates correctly in refresh interval of 30 μs) |
| | | Initializing PIT channel 2 ( checks whether the speaker gate operates correctly) |
| | | Measuring CPU clock |
| | | Enabling SMI other than auto-off function |
| | | Control of battery discharging current |
| | | Performing timeshared process for time measurement of IRT |
| | Initializing CPU | Updating P6 micro-code |
| | | Enabling or disabling the function of processor serial number ID |
| | | Checking whether Geyserville is supported |
| | | Switching CPU clock speed to high |
| | | Setting Graphics Aperture Size |
| F107h | Initializing ACPI, KBC, VGA, sound function, and PIC | Storing the size of ROM in a buffer |
| | | Reading EC version |
| | | Updating the type of flash memory |
| | | Determining the destination |
| | | Checking the default settings of CMOS |
| | | Initializing ACPI table |

Table 2-3 D port status (4/6)

| D port status | Inspection items | details |
|---|---|---|
| F107h | | Initializing devices before initializing PCI bus |
| | | Initializing temperature control information |
| | | Setting up a clock generator |
| | | AC’97 control |
| | | Initializing HC and recognizing devices |
| | | Initializing a KBC |
| | | Turning VGA display off and controlling reset |
| | | Initializing sound function |
| | | Starting the computer multiple box status check |
| | | Initializing a PCI |
| | | Testing a PIC |
| | | Initializing password |
| F108h | Initializing PCI | Starting sequence of HDD initializing |
| | | Initializing PCI bus |
| | | Checking the factor of WakeUp |
| F109h | | Running a task waiting for the end of INIT_PCI |
| | | Initializing the data in CMOS (2) |
| | Setting up the setup parameters | Setting Power off enable |
| | | Clearing wake-up conditions |
| | | CPU speed control |
| | | Control of panel open/close |
| | | Serial interrupt control |
| | | Serial interrupt control ( before using interrupts) |
| | | Initializing PC Card Slots |
| | Auto-configuration of PCI | Creating a work area for auto configuration |
| | | Configuration |
| | | Storing the results of VGA configuration |
| F10Bh | | Running a task waiting for completion of PCI_CONFIGURATION |
| | Initializing H/W required after PCI configuration | Enabling/Disabling IEEE1394 |
| | | Generating output codes |
| F10Ch | Checking the first 64KB of memory | Checking the first 64KB of memory |
| F10D | Initializing interrupt vectors | Initializing interrupt vectors |

*Table 2-3 D port status (5/6)*

| D port status | Inspection items | Details |
|---|---|---|
| F10Eh | Initializing a NDP | Initializing a NDP |
| F10Fh | Setting up system | Storing CMOS error information in SMRAM |
| | | Initializing timer |
| | | Initializing a buffer for power saving |
| | | Initializing an EC, and reading battery information |
| | | Updating system BIOS (model name, and EDID of the LCD) |
| F110h | Initializing the display | Waiting for completion of initializing VGA chip and initializing VGA BIOS |
| F111h | Displaying a logo | Displaying a logo on the screen |
| F112h | Checking conventional memory | Checking conventional memory |
| F113h | Checking exception in protect mode | Checking exception in protect mode |
| F114h | Checking DMA Page Register | Checking DMA Page Register |
| F117h | Checking DMAC | Checking DMAC |
| F118h | Initializing DMAC | Initializing DMAC |
| F119h | Checking password | Waiting for the end of the FDD initialization process |
| | | Waiting for the end of the HDD initialization |
| | | Checking key-in pressed during the IRT |
| | | Prioritizing ATA |
| F11Ch | Checking optional I/O ROM | Checking optional I/O ROM |
| F11Dh | Final setting up prior to boot-up | Storing the value of 40;00 |
| | | Setting up the address of font data for resuming password |
| | | Setting up the parameters for character repeat on a USB keyboard |
| | | Getting keys pressed during the IRT |
| | | Storing shadow RAM size |
| | | Updating system resources information prior to boot-up |
| | | Renewing memory mapping data for INT15h E820h function |
| | | Updating a table for DMI |
| | | Copying an ACPI table to the top of an expansion memory |
| | | Waiting for the end of writing PSC version on BIOS |
| | | Waiting for the end of serial port initialization |

*Table 2-3 D port status (6/6)*

| D port status | Inspection items | details |
|---|---|---|
| F11Dh | | Canceling NMI mask |
| | | Examining the checksum of TIT |
| | | Clearing IRT running flag for runtime |
| | | Update checksum for runtime |
| | | Checking whether a CPU, an HDD or other component have been upgraded |
| | | Disabling a PC Card that is not being used |
| | Initializing HW just before BOOT and waiting for the completion | Setting up battery safe mode |
| | | Setting up date |
| | | Waiting for the end of AC-Link initialization |
| | | Updating DMI Wakeup factor and SM-BIOS structure table |
| | | Closing configuration space of PCI devices |
| | | Cache control |
| | Treating CPU-related items | Updating parameter block A |
| | | Setting up the clock speed of the CPU to the appointed value by the Setup |
| | | Waiting for the motor off of a disabled HDD |
| | Treating after PRE_BOOT_SETUP | Clearing power button status |
| | | Enabling the power button |
| FFFFh | Completion | Completion of checking DPORT status |

Check 1 If the D port status error code F11Ah is displayed, go to the 3.5" USB FDD Troubleshooting Procedures in Section 2.5 or the 1.8" HDD Troubleshooting Procedures in Section 2.6.

Check 2 If any other D port status error code is displayed, perform Procedure 3.

D port error statuses are following:

| Error code | Contents |
|---|---|
| F160h | Timer CH2 error |
| F161h | PIT error |
| F162h | PIC #1 error |
| F163h | PIC #2 error |
| F11Eh | Clock generator setting error |

### Procedure 3 Diagnostic Test Program Execution Check

Execute the following tests from the Diagnostic Test Menu. These tests check the System board and I/O unit. Refer to Chapter 3, *Tests and Diagnostic,* for more information on how to perform these tests.

1. System test
2. Memory test
3. Keyboard test
4. Display test
5. Floppy Disk test
6. ASYNC test
7. Hard Disk test
8. Real Timer test
9. NDP test
10. Expansion test
11. Sound/LAN/Modem test

If an error is detected during these tests, go to Procedure 4.

### Procedure 4 Replacement Check

I/O units or System board may be damaged. Replace the I/O units or disassemble the computer following the steps described in Chapter 4 and replace the System board with a new one.

## 2.5 USB 3.5” FDD Troubleshooting

This section describes how to determine if the USB 3.5” FDD is functioning properly. Perform the steps below starting with Procedure 1 and continuing with the other procedures as required.

Procedure 1: FDD Head Cleaning Check

Procedure 2: Diagnostic Test Program Execution Check

Procedure 3: Connector Check and Replacement Check

### Procedure 1 FDD Head Cleaning Check

FDD head cleaning is one option available in the Diagnostic Program.

Insert the Diagnostics Disk in the floppy disk drive of the computer, turn on the computer and run the test. And then clean the FDD heads using the cleaning kit. If the FDD still does not function properly after cleaning, go to Procedure 2.

Detailed operation is given in Chapter 3, *Tests and Diagnostics*.

If the test program cannot be executed on the computer, go to Procedure 3.

## Procedure 2 Diagnostic Test Program Execution Check

Insert the Diagnostics Disk in the FDD of the computer, turn on the computer and run the test. Refer to Chapter 3, *Tests and Diagnostics,* for more information about the diagnostics test procedures.

Make sure the floppy disk is formatted correctly and that the write protect tab is disabled. Floppy disk drive test error codes and their status names are listed in Table 2-4. If any other errors occur while executing the FDD diagnostics test, go to Check 1.

*Table 2-4 FDD error code and status*

| Code | Status |
|---|---|
| 01h | Bad command |
| 02h | Address mark not found |
| 03h | Write protected |
| 04h | Record not found |
| 06h | Media replaced |
| 08h | DMA overrun error |
| 09h | DMA boundary error |
| 10h | CRC error |
| 20h | FDC error |
| 40h | Seek error |
| 60h | FDD not drive |
| 80h | Time out error (Not ready) |
| EEh | Write buffer error |
| FFh | Data compare error |

Check 1 If the following message is displayed, disable the write protect tab on the floppy disk by sliding the write protect tab to "write enable". If any other message appears, perform Check 2.

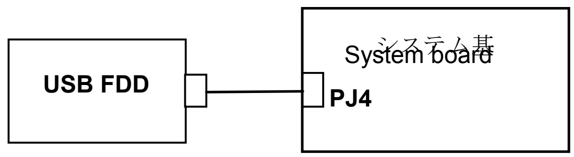
```
Write protected
```

Check 2 Make sure the floppy disk is formatted correctly. If it is, go to Procedure 3.

## Procedure 3 Connector Check and Replacement Check

The USB FDD connector may be disconnected from the System board. Check visually that the connector is connected firmly.

Check 1 Make sure the following cable and connector are firmly connected to the connector PJ4 (USB1) on the System board.




If any of the connections are loose, reconnect firmly and repeat Procedure 2. If there is still an error, go to Check 2.

Check 2 The USB FDD may be defective or damaged. Replace it with a new one. If the FDD is still not functioning properly, perform Check 3.

Check 3 Replace the System board with a new one following the steps in Chapter 4, *Replacement Procedures*.

## 2.6 1.8" HDD Troubleshooting

This section describes how to determine if the 1.8" HDD is functioning properly. Perform the steps below starting with Procedure 1 and continuing with the other procedures as required.

Procedure 1: Partition Check

Procedure 2: Message Check

Procedure 3: Format Check

Procedure 4: Diagnostic Test Program Execution Check

Procedure 5: Connector Check and Replacement Check

> ***CAUTION**: The contents of the 1.8" hard disk will be erased when the 1.8" HDD troubleshooting procedures are executed. Transfer the contents of the hard disk to floppy disks or other storage drive(s). For the backup, refer to the User's Manual.*

### Procedure 1 Partition Check

Insert the Toshiba MS-DOS system disk and start the computer. Perform the following checks:

Check 1 Type **C:** and press **[Enter]**. If you cannot change to drive C, go to Check 2. If you can change to drive C, go to Procedure 2.

Check 2 Type **FDISK** and press **[Enter]**. Choose Display Partition Information from the FDISK menu. If drive C is listed in the Display Partition Information, go to Check 3. If drive C is not listed, return to the FDISK menu and choose the option to create a DOS partition or a logical DOS drive on drive C. If the problem still exists, go to Procedure 2.

Check 3 If drive C is listed as active in the FDISK menu, go to Check 4. If drive C is not listed as active, return to the FDISK menu and choose the option to set the active partition for drive C. Then go to Procedure 2.

Check 4 Remove the system disk from the FDD and reboot the computer. If the problem still exists, go to Procedure 2. Otherwise, the HDD is operating normally.

### Procedure 2 Message Check

When the power is turned on, the system performs the Initial Reliability Test (IRT) installed in the BIOS ROM. When the test detects an error, an error message is displayed on the screen.

Make sure of no floppy disk in the FDD. Turn on the computer and check the message on the screen. When an OS starts from the 1.8" HDD, go to Procedure 3. Otherwise, start with Check 1 below and perform the other checks as instructed.

Check 1 If any of the following messages appear, go to Procedure 3. If the following messages do not appear, perform Check 2.

```
HDC ERROR
```
or

`HDD #X ERROR` (After 5 seconds this message will disappear.)

Check 2 If either of the following messages appears, go to Check 3. If the following messages do not appear, perform Check 5.

```
Insert system disk in drive
Press any key when ready .....
```
or
```
Non-System disk or disk error
Replace and press any key when ready
```

Check 3 Check SETUP to see whether the Hard Disk option is set to Not used. If it is set to Not used, choose another setting and return to Check 1. If it is not set to Not used, go to Check 4.

Check 4 Using the SYS command of the MS-DOS, transfer the system to the 1.8" HDD. If the system is not transferred, go to Procedure 3. Refer to the MS-DOS Manual for detailed operation.

If the following message appears on the display, the system program has been transferred to the HDD.

```
System Transferred
```

If an error message appears on the display, perform Check 5.

Check 5 The 1.8" HDD and the connector of the System board may be disconnected (Refer to the steps described in Chapter 4, *Replacement Procedures* for disassembling.). Insert the connectors firmly. If they are firmly connected, go to Procedure 3.

### Procedure 3 Format Check

The computer's 1.8" HDD is formatted using the MS-DOS FORMAT program or the physical format program of the test program. To format the 1.8" HDD, start with Check 1 below and perform the other steps as required.

Refer to the MS-DOS Manual for the operation of MS-DOS. For the format by the test program, refer to the Chapter 3.

Check 1 Format the 1.8" HDD using MS-DOS FORMAT command. Type as **FORMAT C:/S/U**.

If the 1.8" HDD can not be formatted, perform Check 2.

Check 2 Using the MS-DOS FDISK command, set the 1.8" HDD partition. If the partition is not set, go to Check 3. If it is set, format the 1.8" HDD using MS-DOS FORMAT command.

Check 3 Using the Diagnostic Disk, format the 1.8" HDD with a format option (physical format). If the 1.8" HDD is formatted, set the 1.8" HDD partition using MS-DOS FDISK command.

If you cannot format the 1.8" HDD using the Tests and Diagnostic program, go to Procedure 4.

## Procedure 4 Diagnostic Test Program Execution Check

The HDD test program is stored in the Diagnostics Disk. Perform all of the HDD tests in the Hard Disk Drive Test. Refer to Chapter 3, *Tests and Diagnostics,* for more information about the HDD test program.

If an error is detected during the HDD test, an error code and status will be displayed. The error codes and statuses are described in Table 2-5. If an error code is not displayed but the problem still exists, go to Procedure 5.

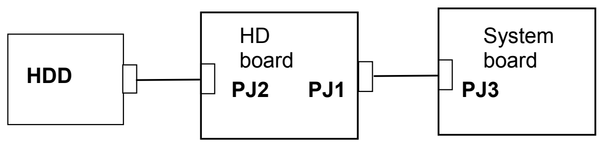
*Table 2-5 1.8" HDD error code and status*

| Code | Status |
|---|---|
| 01h | Bad command |
| 02h | Address mark not found |
| 04h | Record not found |
| 05h | HDC not reset |
| 07h | Drive not initialized |
| 08h | HDC overrun error (DRQ) |
| 09h | DMA boundary error |
| 0Ah | Bad sector error |
| 0Bh | Bad track error |
| 10h | ECC error |
| 11h | ECC recover enable |
| 20h | HDC error |
| 40h | Seek error |
| 80h | Time out error |
| AAh | Drive not ready |
| BBh | Undefined error |
| CCh | Write fault |
| E0h | Status error |
| EEh | Access time out error |
| DAh | No HDD |

### Procedure 5 Connector Check and Replacement Check

The HDD is connected to the connector PJ3 of the System board. The connecting portion may be disconnected. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures* and perform the following checks to check the connecting portion:

Check 1 Make sure the following connector is firmly connected to the HDD and System board.




If any of the connections are loose, reconnect firmly and repeat Procedure 1. If there is still an error, go to Check 2.

Check 2 The 1.8" HDD may be damaged. Replace it with a new one and check the operation. If the problem still exists, perform Check 3.

Check 3 The System board may be damaged. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*.

## 2.7 Keyboard Troubleshooting

To determine if the computer's keyboard is functioning properly, perform the following procedures. Start with Procedure 1 and continue with the other procedures as instructed.

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector Check and Replacement Check

### Procedure 1 Diagnostic Test Program Execution Check

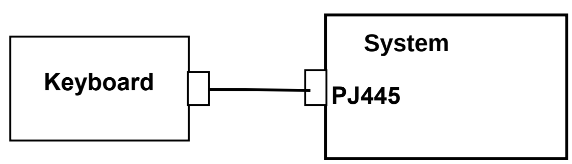
Execute the Keyboard Test in the Diagnostic Program. Refer to Chapter 3, *Tests and Diagnostics* for more information on how to perform the test program.

If an error occurs, go to Procedure 2. If an error does not occur, the keyboard is functioning properly.

### Procedure 2 Connector Check and Replacement Check

The keyboard or System board may be disconnected or damaged. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures* and perform the following checks:

Check 1 Make sure the keyboard cable is firmly connected to the System board.




If the connection is loose, reconnect firmly and repeat Procedure 1. If there is still an error, go to Check 2.

Check 2 The keyboard may be damaged. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*. If the problem still exists, perform Check 3.

Check 3 The System board may be damaged. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*.

## 2.8 Display Troubleshooting

This section describes how to determine if the computer's display is functioning properly. Start with Procedure 1 and continue with the other procedures as instructed.

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector and Cable Check

Procedure 3: Fuse Conduction Check

Procedure 4: Replacement Check

### Procedure 1 Diagnostic Test Program Execution Check

The Display Test program is stored on the Diagnostics disk. Insert the Diagnostics disk in the computer's floppy disk drive, turn on the computer and run the test. Refer to Chapter 3, *Tests and Diagnostics* for details.

This program checks the display controller on the System board. If an error is detected, go to Procedure 3.

### Procedure 2 Connector and Cable Check

The LCD module is connected to the System board through the LCD harness. The cable may be disconnected from each board or damaged. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures*. If the connection is loose, reconnect firmly and repeat Procedure 2. If there is still an error, go to Procedure 3.

### Procedure 3 Fuse Conduction check

Some fuses may be blown. To test the conduction of the fuse F5600 and F56001 near the I/F connector (PJ5600/PJ5601), disassemble the computer following the steps described in Chapter 4, *Replacement Procedures*. If either fuse is blown, replace the system board repeat Procedure 3. If there is still an error, go to Procedure 4.

### Procedure 4 Replacement Check

The display unit has a FL inverter board, Display module, System board, LCD harness and Display ON/OFF switch. Any of the components may be damaged. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures,* then perform the following checks:

(1) If characters or graphics are not displayed on the internal display, perform Check 1.

(2) If characters are displayed on the internal display but the display is not normal, perform Check 2.

(3) If characters are displayed on the internal display but the display is dark (the back-light does not light), perform Check 5.

Check 1 The display ON/OFF switch may be damaged. Remove the display ON/OFF switch and repeat Procedure 4. If there is still an error, go to Check 2.

Check 2 The LCD harness may be damaged. Replace the damaged harness with a new one and repeat Procedure 4. If there is still an error, go to Check 3.

Check 3 The display module may be damaged. Replace it with a new one and repeat Procedure 4. If there is still an error, go to Check 4.

Check 4 The FL inverter board may be damaged. Replace it with a new one and repeat Procedure 4. If there is still an error, go to Check 5.

Check 5 The FL may be damaged. Replace it with a new one and repeat Procedure 4. If there is still an error, go to Check 6.

Check 6 The display controller of the System board may be damaged. Replace the System board with a new one.

## 2.9 Touch Pad

To determine whether the Touch Pad is faulty or not, perform the following procedures:

Procedure 1 Diagnostic Test Program Execution Check

Procedure 2 Connector checking and replacement checking

Procedure 3: Replacement Check

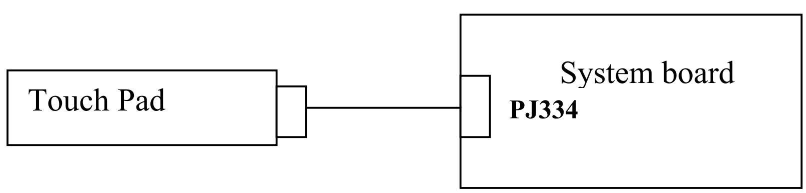
### Procedure 1 Diagnostic Test Program Execution Check

Execute the keyboard test program, or maintenance test program, because the pointing device test program is a component of the keyboard test program. For the operating procedure, see Chapter 3.

If any error is detected, perform Procedure 2. The pointing device is operating normally if no error is detected.

### Procedure 2 Connector checking and replacement checking

The touch pad is connected to the System board (PJ334) with a flexible cable. This cable may have come off the connector or the connector may have come off the System board. Disassemble the computer and check the cable connections. See Chapter 4 for the disassembly procedure. If the connector has come off, connect firmly and make sure the operation. If there is still an error, go to Procedure 3.




### Procedure 3 Replacement Check

The touch pad may be damaged. Replace the touch pad.

## 2.10 Modem

To check if the modem is defective or malfunctioning, follow the troubleshooting procedures below as instructed.

Procedure 1 Diagnostic Test Program Execution Check

Procedure 2 Connector Check and Replacement Check

### Procedure 1 Diagnostic Test Program Execution Check

Execute the Modem test program available as part of the maintenance test program. This program checks the modem. See Chapter 3 for information on how to perform the test.

If any error is detected by the test, go to Procedure 2.

### Procedure 2 Connector Check and Replacement Check

The Modem jack is connected to the MDC board and MDC board is connected to the System board. If the modem malfunctions, these connections may be bad or the MDC or System board might be faulty.

Disassemble the computer following the steps described in Chapter 4 and perform the following checks:

Check 1 Make sure the MDC has been firmly connected to the PJ3 on the HD board. And make sure the PJ1 on the HD board has been firmly connected to the PJ3 on the System board




If any connector is disconnected, connect it firmly and return to Procedure 1. If there is still an error, perform Check 2.

Check 2 The Modem jack may be faulty. Replace it with a new one. If the modem function is still not working properly, perform Check 3.

Check 3 The MDC may be faulty. Replace it with a new one following the steps in Chapter 4. If the modem function is still not working properly, perform Check 4.

Check 4 The System board may be faulty. Replace it with a new one following the instructions in Chapter 4.

# 2.11 LAN

To check if the computer's LAN is defective or malfunctioning, follow the troubleshooting procedures below as instructed.

Procedure 1 Diagnostic Test Program Execution Check

Procedure 2 Connector Check and Replacement Check

### Procedure 1 Diagnostic Test Program Execution Check

To check the LAN function, execute the Modem test program subtest 03 (LAN loop-back test). See Chapter 3 for information on how to perform the test.

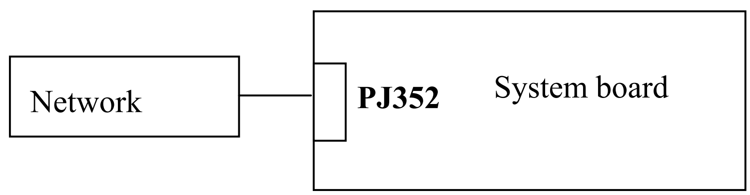
If any error is detected by the test, go to Procedure 2.

### Procedure 2 Connector Check and Replacement Check

The LAN function is installed on the System board. The modem/LAN jack is connected to the System board by the cable. If the LAN malfunctions, the connection is bad or the System board might be faulty.

Disassemble the computer following the steps described in Chapter 4 and perform the following checks:

Check 1 Check if the LAN jack is connected firmly to the connector PJ352 of the System board.




If it is loose or disconnected, connect it firmly and return to Procedure 1. If there is still an error, perform Check 2

Check 2 The LAN jack may be defective. Replace the LAN jack with a new one. If the problem persist, perform Check 3.

Check 3 The System board may be faulty. Replace the System board following the steps described in Chapter 4.

# 2.12 Sound

To check if the sound function is defective or malfunctioning, follow the troubleshooting procedures below as instructed.

Procedure 1 Diagnostic Test Program Execution Check

Procedure 2 Connector Check

Procedure 2 Replacement Check

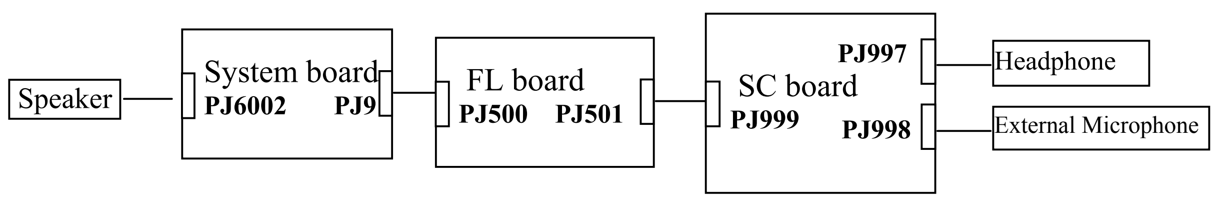
## Procedure 1 Diagnostic Test Program Execution Check

Execute the Sound test program available as part of the maintenance test program. See Chapter 3 for information on how to perform the test.

If any error is detected by the test, go to Procedure 2

## Procedure 2 Connector Check

The speakers are connected to the System board shown in the following figure.




These connecters may have come off. Disassemble the computer and check the connector connections.

Execute Chapter 1 if the speaker is not working properly.

Go to Check 2 if the external Microphone terminal and the Headphone are not working properly.

Check 1 If the speaker is not working properly, the speaker cable may come off. Make sure the speaker cables are connected to the System board PJ10 firmly. If there is still an error, perform Check 3

Check 2 If external Microphone terminal and the Headphone are not working properly, the cable between the System board and SC board, or the System board and FL board may come off. Or the cable between the SC board and the Microphone terminal or the SC board and the Headphone may come off. Make sure those cables are connected firmly. If there is still an error, perform Check 3.

### Procedure 3 Replacement Check

Check 1 If the speaker is not working properly, the speaker may be faulty. Replace it with a new one following the steps in Chapter 4. If the speaker is still not working properly, go to Check 2.

Check 2 The System board may be faulty. Replace it with a new one following the instructions in Chapter 4.

Check 3 The external Microphone terminal and the Headphone are not working properly, the System board, the FL board or the SC board may be faulty. Replace those boards with new ones following the steps in Chapter 4.

## 2.13 SD card slot

To check if the SD card/Smart Media slot is good or no good, follow the troubleshooting procedures below as instructed.

Procedure 1 Check on Windows

Procedure 2 Connector/Replacement Check

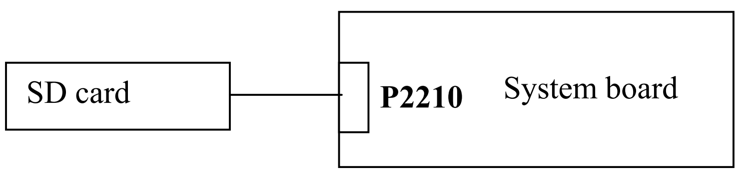
### Procedure 1 Check on Windows

Insert a SD card into the slot. Check if the installed Windows XP recognizes automatically the SD card and the data in the SD card can be read.

If the card is nor recognized or data are not read, go to Procedure 2.

### Procedure 2 Connector/Replacement Check

The SD card is connected to the connector PJ364 of the System board.




Check 1 Check the SD card is firmly inserted to the connector PJ2210 of the System board. If not, insert it firmly. If the SD card is still not functioning properly, perform Check 2.

Check 2 The SD card may be faulty. Replace it with a new one in order. If the problem persists, perform Check 3.

Check 3 The System board may be faulty. Replace it with a new one.

## 2.14 Wireless LAN Troubleshooting

To check if the Wireless LAN is good or no good, follow the troubleshooting procedures below as instructed.

Procedure 1: Transmitting-Receiving Check

Procedure 2: Antennas' Connection Check

Procedure 3: Antennas' Capability Check

Procedure 4: Replacement Check

### Procedure 1 Transmitting-Receiving Check

Make sure the wireless communication switch on the computer is turned ON. If it is not, turn ON.

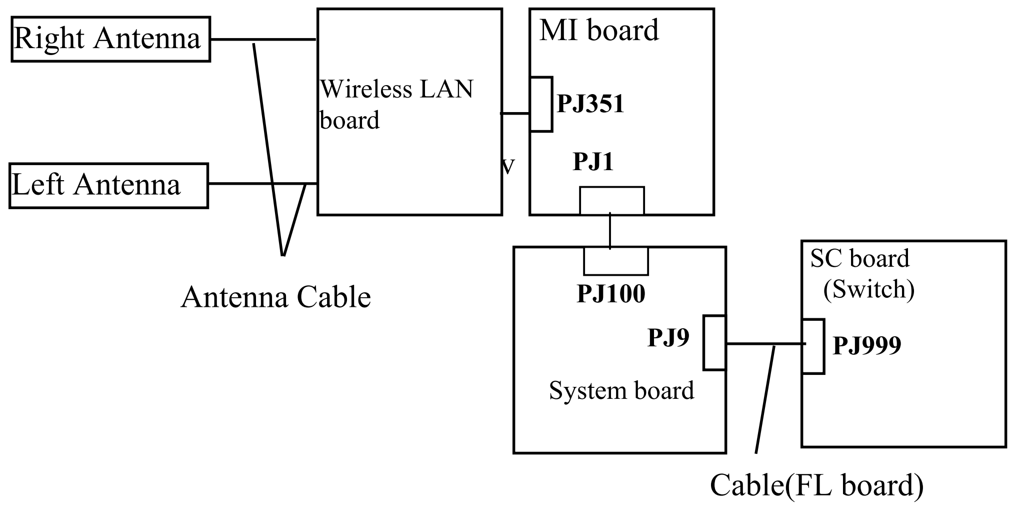
Check 1 Execute test program CERT201T.EXE to check the transmitting-receiving function of the wireless LAN. You will need a second computer that can communicate by the wireless LAN

If the computer passes the test, the function is correctly working.

If the computer does not pass the test, perform Procedure 2.

## Procedure 2 Antennas' Connection Check

The wireless LAN function wiring diagram is shown below:




Any of the connections may be disconnected. Disassemble the computer following the steps described in Chapter 4, perform the following checks:

Check 1 Make sure the connection between the Wireless board, MI board and the System board (the connector PJ351 on MI board and the System board connector PJ100).

If the connecter is disconnected, connect firmly then return to Procedure 1. If there is still an error, go to Check 2.

Check 2 Make sure the wireless LAN antennas (black and white) are firmly connected to the Wireless board. If the antennas are disconnected, connect firmly then return to Procedure 1. If there is still an error , go to Check 3.

Check 3 Make sure the connection between the SC board PJ999 and the System board PJ9.

If the cable is disconnected, connect firmly then return to Procedure 1. If there is still an error, perform Procedure 3.

## Procedure 3 Antenna Check

Use an antenna test cable to check the antennas' connection. Follow the steps below.

Any of the connections may be disconnected. Disassemble the computer following the steps described in Chapter 4, perform the following checks

1. Disconnect the wireless LAN antenna (white and black) from the wireless LAN board.
2. Connect the tester set up for impedance measurement to the antenna jig. Measure the white antenna's resistance
3. Determine the resistance. The antenna passes the test when the resistance is less than 5Ω. If it is more than 5Ω, the antenna is faulty.
4. Measure the black antenna's resistance. Check if there is faulty.

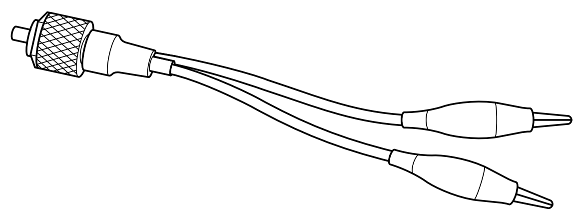


*Figure 2-4 Antenna Test jig*

| Measurement Value | Pass/fail | Comment |
|---|---|---|
| Less than 5Ω | Pass | Include cable loss |
| More than 5Ω | Fail | The digital tester shows 0L ,etc. if there is a broken wire. |

***NOTE**:* 1. *The resistances determined with the steps above may not be stable according to the length of the antenna. The impedance of the antenna itself is about 0.5-0.8Ω.*

2. *The above steps cannot accurately determine the impedance of the antenna. Use an LC meter for a precise measure of impedance.*

If each wireless antenna pass the above test, return the Wireless LAN module back, then perform Procedure 1.

If the wireless LAN has still an error, go to Procedure 4.

### Procedure 4 Replacement Check

Check if the wireless LAN board, MI board, SC board and the System board are connected properly. Any of these components may be damaged. Disassemble the computer following the steps described in Chapter 4 and replace the board with a new one.

Check 1 The wireless LAN board or the MI board may be defective or damaged. Disassemble the computer following the steps described in Chapter 4 and replace the board with a new one. If there is still an error go to Check 2.

Check 2 The SC board may be defective or damaged. Disassemble the computer following the steps described in Chapter 4 and replace the board with a new one. If there is still an error go to Check 3.

Check 3 The System board may be defective or damaged. Disassemble the computer following the steps described in Chapter 4 and replace the board with a new one.

# Chapter 3

# Tests and Diagnostics

# Chapter 3 Contents

## Tables

## 3.1 The Diagnostic Test

This chapter explains how to use the Diagnostic Test program to test the functions of the computer's hardware modules. They are grouped into the Service Program Modules and the Test Program Modules and the Diagnostic Test consists of 10 programs.

> ***NOTE:*** *To start the diagnostics, follow these steps:*
>
> *1. Check all cables for loose connections.*
>
> *2. Exit any application and close Windows.*

The DIAGNOSTIC MENU consists of the following 8 test programs.

- ❑ DIAGNOSTIC TEST
- ❑ HARD DISK FORMAT
- ❑ HEAD CLEANING
- ❑ LOG UTILITIES
- ❑ RUNNING TEST
- ❑ FDD UTILITIES
- ❑ SYSTEM CONFIGURATION
- ❑ SETUP

The DIAGNOSTIC TEST MENU contains the following 9 functional tests:

- ❑ SYSTEM TEST
- ❑ MEMORY TEST
- ❑ KEYBOARD TEST
- ❑ DISPLAY TEST
- ❑ FLOPPY DISK TEST
- ❑ HARD DISK TEST
- ❑ REAL TIMER TEST
- ❑ NDP TEST
- ❑ EXPANSION TEST

You will need the following equipment to perform some of the Diagnostic test programs.

- ❑ The Diagnostics Disk (all tests, 3 disks)
- ❑ A formatted working disk (Floppy disk test)
- ❑ A cleaning kit to clean the floppy disk drive heads (FDD Head Cleaning)
- ❑ A PC card wraparound connector (Expansion test)
- ❑ An external CRT monitor (Expansion test)
- ❑ Headphone (Sound/LAN/Modem test)
- ❑ A microphone (Sound/LAN/Modem test)
- ❑ FAT-MODE inspection device (Sound/LAN/Modem test)

The following sections detail the tests of the DIAGNOSTIC TEST MENU. Refer to Sections 3.13 through 3.24 for detailed information on the remaining Service Program Module functions.

## 3.2 Executing the Diagnostic Test

To start the DIAGNOSTIC PROGRAM, follow these steps:

1. Insert the test program disk (No.1) in the floppy disk drive.
2. Turn on the computer by pressing the F12 key and, select the FDD in the display for selecting booting unit. Then press ENTER. The following menu will appear:

```
TOSHIBA personal computer XXXX DIAGNOSTICS
version X.XX (c) copyright TOSHIBA Corp. 20XX

DIAGNOSTICS MENU :

1 - DIAGNOSTIC TEST
2 - HARD DISK FORMAT
3 -
4 - HEAD CLEANING
5 - LOG UTILITIES
6 - RUNNING TEST
7 - FDD UTILITIES
8 - SYSTEM CONFIGURATION
9 - EXIT TO MS-DOS

                              ↑↓→←    :   Select items
                              Enter   :   Specify
                              Esc     :   Exit
```

> ***NOTE**: To exit the DIAGNOSTIC TEST MENU, press the **[Esc]** key. If a test program is in progress, press **[ Ctrl]** + **[Break]** to exit the test program. If a test program is in progress, press **[Ctrl]** + **[C]** to stop the test program.*

3. Set the highlight bar to **1**, and press **Enter**. The following TEST MENU will appear:

```
TOSHIBA personal computer XXXX DIAGNOSTICS
Version X.XX (c) copyright TOSHIBA Corp. 20XX
DIAGNOSTIC TEST MENU :

 1 - SYSTEM TEST
 2 - MEMORY TEST
 3 - KEYBOARD TEST
 4 - DISPLAY TEST
 5 - FLOPPY DISK TEST
 6 -
 7 –
 8 - HARD DISK TEST
 9 - REAL TIMER TEST
10 - NDP TEST
11 - EXPANSION TEST
12 -
13 –
14 –
88 - ERROR RETRY COUNT SET [FDD & HDD]
99 - EXIT TO DIAGNOSTICS MENU

                              ↑↓→←    :   Select items
                              Enter   :   Specify
                              Esc     :   Exit
```

Functions 1 through 14 are the Diagnostic Tests. Function 88 sets the floppy disk drive and hard disk drive error retry count (0-255).

Return to the Diagnostics Menu, set the highlight bar to Function 99 and press **Enter**.

4. Select the option you want to execute on the test menu and press **Enter**. When you select `1- SYSTEM TEST`, the following message will appear:

```
TEST NAME    XXXXXXX        XXXX DIAGNOSTIC TEST VX.XX
                            [Ctrl]+[Break] ; test end
                            [Ctrl]+[C]     ; key stop

SUB-TEST : XX
PASS COUNT: XXXXX      ERROR COUNT: XXXXX
WRITE DATA: XX         READ DATA : XX
ADDRESS : XXXXXX       STATUS  : XXX

SUB-TEST MENU :

01 - ROM checksum
02 -
03 -
04 – Fan ON/OFF
05 - Geyserville
06 - Quick charge
07 - DMI read
08 - DMI write
09 - CPU Temperature
99 - Exit to DIAGNOSTIC TEST MENU

                        ↑↓→←   :  Select items
                        Enter  :  Specify
                        Esc    :  Exit
```

> ***NOTE**: The menu displayed by your computer may be slightly different from the one shown above.*

5. Select the desired subtest number from the subtest menu and press **Enter**. The following message will appear:

```
TEST LOOP  : YES (or NO)
ERROR STOP : YES (or NO)
```

Use the right and left arrow keys to move the cursor to the desired option.

Selecting **YES** of TEST LOOP increases the pass counter by one, each time the test cycle ends and restarts the test cycle.

Selecting **NO** of TEST LOOP returns the process to the subtest menu after the test is complete.

Use the up and down arrow keys to move the cursor to "**ERROR STOP**".
Use the right and left arrow keys to move the cursor to the desired option and press **Enter**.

Selecting **YES** of ERROR STOP stops the test program when an error is found and displays the operation guide on the right side of the display screen as shown below:

```
ERROR STATUS NAME   [[ HALT OPERATION ]]

                              1: Test end
                              2: Continue
                              3: Retry
```

Press [1]  Terminates the test program and returns to the subtest menu.
Press [2]  Continues the test.
Press [3]  Restarts the test from the error.

Selecting **NO** of ERROR STOP keeps the test running even if an error is found. When an error occurred, the error status is displayed and the error counter is increased by one.

6. Table 3-1 in section 3.3 describes the function of each test on the subtest menu. Table 3-2 in section 3.17 describes the error codes and error status for each error.

## 3.3 Subtest

Table 3-1 lists the subtest names for each test program in the DIAGNOSTIC TEST MENU.

*Table 3-1 Subtest names (1/2)*

| No. | Test Name | Subtest No. | Subtest Name |
|---|---|---|---|
| 1 | SYSTEM | 01 | ROM checksum |
| | | 04 | Fan ON/OFF |
| | | 05 | Geyserville |
| | | 06 | Quick charge |
| | | 07 | DMI read |
| | | 08 | DMI write |
| | | 09 | CPU Temperature |
| 2 | MEMORY | 01 | Conventional memory |
| | | 02 | Protected mode |
| | | 03 | Memory module |
| | | 04 | Cache memory |
| | | 05 | L2 Cache memory |
| | | 06 | Stress |
| 3 | KEYBOARD | 01 | Pressed key display |
| | | 02 | Pressed key code display |
| | | 04 | Pointing Stick |
| | | 05 | USB test |
| | | 07 | Internet/Mail key |
| 4 | DISPLAY | 01 | VRAM read/write for VGA |
| | | 02 | Gradation for VGA |
| | | 03 | Gradation for LCD |
| | | 04 | Gradation & Mode test for VGA |
| | | 05 | All dot on/off for LCD |
| | | 06 | “H” pattern display |
| | | 07 | LCD Brightness |
| 5 | FLOPPY DISK | 01 | Sequential read |
| | | 02 | Sequential read/write |
| | | 03 | Random address/data |
| | | 04 | Write specified address |
| | | 05 | Read specified address |

*Table 3-1 Subtest names (2/2)*

| No. | Test Name | Subtest No. | Subtest Name |
|---|---|---|---|
| 8 | HARD DISK | 01 | Sequential read |
| | | 02 | Address uniqueness |
| | | 03 | Random address/data |
| | | 04 | Cross talk & peak shift |
| | | 06 | Write specified address |
| | | 07 | Read specified address |
| | | 09 | Sequential write |
| | | 10 | W-R-C specified address |
| 9 | REAL TIMER | 01 | Real time |
| | | 02 | Backup memory |
| | | 03 | Real time carry |
| 10 | NDP | 01 | NDP test |
| 11 | EXPANSION | 01 | PCMCIA wraparound |
| | | 03 | RGB monitor ID |
| | SOUND/MODEM/LAN | 01 | Microphone recording & play |
| | | 02 | Sin wave |
| | | 03 | LAN |
| | | 04 | MODEM |

## 3.4 System Test

To execute the System Test, select 1-SYSTEM TEST from the DIAGNOSTIC TEST MENU, press **Enter** and follow the directions on the screen. The System test contains seven subtests. Move the highlight bar to the subtest you want to execute and press **Enter**.

Subtest 01 ROM Checksum

This subtest executes a checksum test of the BIOS ROM (range: F0000h to FFFFFh, 64KB) on the System Board.

Subtest 04 Fan On/Off

This subtest checks CPU fan operation using the on/off command. The following message will appear when this subtest is executed. Make sure the fan does not rotate and press **Enter.**

```
*** Test Fan Revolution 0000RPM Start
```

The following message will appear. Make sure the fan rotates at low speed and press **Enter.**

```
*** Test Fan Revolution Low speed start
```

The following message will appear. Make sure the fan rotates at high speed and press **Enter.**

```
*** Test Fan Revolution High speed start
```

Subtest 05 Gerserville

If the CPU supports Gerserville (SpeedStep), this Subtest checks that the CPU operating clock speed can be changed.

Subtest 06 Quick charge

This subtest checks the status for the quick charge.

Subtest 07 DMI read

The information in the Flash-ROM is displayed in the following format.

```
Model Name       : DyanBook SS XX/XXXXXX
Version Number   : XXXXXXXXXXX
Serial Number    : XXXXXXXXX
Model Number     : XXXXXX-XXXXX
PCN/BND Number   : XXXXXXXXXXXX/XXXXXXXXXXX
UNID Number      : XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

Press [Enter] to EXIT
```

To exit this subtest and return to the SYSTEM test menu, press **Enter**.

Subtest 08 DMI write

The following messages appear in order. Input each information. (If you do not replace the PCB, the DMI information should not be changed.)

1. "Enter Model Name ?"

   Input the computer's name and press **Enter**. (e.g. DynaBook Satellite)

2. "Enter Version Number ?"

   Input the computer's version number and press **Enter**. (e.g. XP341C401A86)

3. "Enter Serial Number ?"

   Input the computer's serial number and press **Enter**. (e.g. Z9012374)

4. "Enter Model Number ?"

   Input the computer's sales model number and press **Enter**. (e.g. XP341C401A86)

5. "Enter Bundle Number ?"

   Input the computer's PCN/bundle number and press **Enter**. (e.g. PCN0482TOZ01/S2A0281D990)

6. When you press **Enter**, the DMI information is written to the Flash-ROM.

Subtest 09 CPU Temperature

This subtest displays the temperature of the CPU

When the subtest is executed, the following message is displayed.

```
CPU TEMP = XX deg C  Throttling level = XXXXh
```

## 3.5 Memory Test

To execute the Memory Test, select 2-MOMORY TEST from the DIAGNOSTIC TEST MENU, press **Enter** and follow the directions on the screen. The Memory test contains six subtests that test the memory module. Move the highlight bar to the subtest you want to execute and press **Enter**.

Subtest 01 Conventional Memory

This subtest writes data to conventional memory (0 to 640 KB). Then reads and compares the result with the original data. The test address is displayed each 4 KB.

Subtest 02 Protected Mode

> ***NOTE***: *The CONFIG.SYS file must be configured without extended memory manager programs such as EMM386.EXE, EMM386.SYS or QEMM386.SYS. Also, the HIMEM.SYS must be deleted from the CONFIG.SYS file.*

This subtest writes constant data and address data then reads the new data and compares the result with the original data.

Subtest 03 Memory module

This subtest writes constant data and address data in an expanded memory module then reads the new data and compares the result with the original data.

Subtest 04 Cache Memory

To test the cache memory, a pass-through write-read comparison of ‘5A’ data is run repeatedly to the test area (‘7000’:’Program’ size to ‘7000’:’7EEE’ (32 KB)) to check the hit-miss ratio (on/off status) for CPU cache memory.

Number of misses $<$ Number of hits $\rightarrow$ OK
Number of misses $\geq$ Number of hits $\rightarrow$ NG

Subtest 05 L2 Cache Memory

To test the L2 cache memory, a pass-through write-read comparison of '5A' data is run repeatedly to the test area ('7000':'Program' size to '7000':'7FFF' (32 KB)) to check the hit-miss ratio (on/off status) for L2 cache memory.

Number of misses < Number of hits → OK
Number of misses ≥ Number of hits → NG

Read/Write/ Compare data directly by G.A. operation for the TAG-RAM.

Subtest 06 Stress

This test prepares the write/read buffer (size:1b30h) and produce write date in the write buffer. The write data is written in the area larger than 1 MB and read into the read buffer then repeated to compare until maximum size.

Test data:

ffh, ffh, ffh, ffh, ffh
00h, 00h, 00h, 00h, 00h
ffh, ffh, ffh, 00h, ffh
00h, 00h, 00h, ffh, 00h
00h, ffh, ffh, ffh, ffh
00h, 00h, 00h, 00h, aah

These data are generated repeatedly by 1b30h size.

## 3.6 Keyboard Test

To execute the Keyboard Test, select 3-KEYBOARD TEST from the DIAGNOSTIC TEST MENU, press **Enter** and follow the directions on the screen. The Keyboard test contains five subtests that test the computer's keyboard actions. Move the highlight bar to the subtest you want to execute and press **Enter**.

Subtest 01 Pressed Key Display

When you execute this subtest, the keyboard layout is drawn on the display as shown below. When any key is pressed, the corresponding key on the screen changes to the key character that was pressed. Holding a key down enables the auto-repeat function which causes the key's display character to blink.

Press **DEL** + **Enter** to exit.

Subtest 02 Pressed Key Code Display

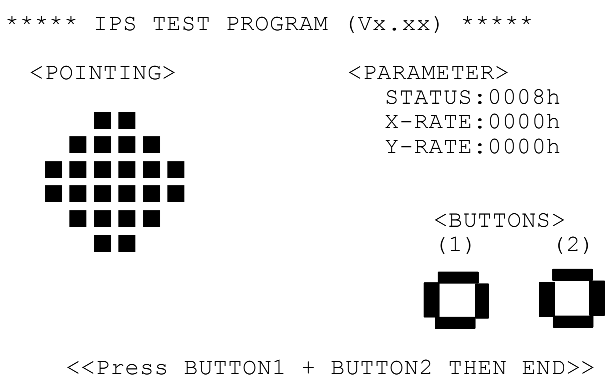
This test displays scan code, character code and key top of the pressed key.

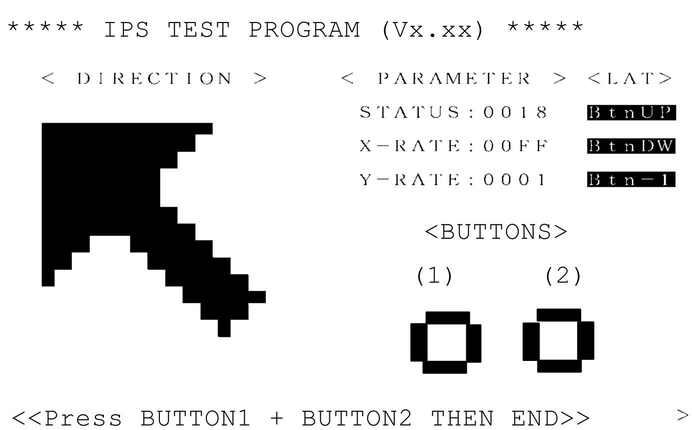
Subtest 04 Touch pad/IPS

This subtest checks the functions of the touch pad as shown below.

A) Direction of touch pad.
B) Touch pad switch function check.

This test reports the response of touch pad, and touch pad switch. When you touch the touch pad and slide your finger towards the upper left, the `<DIRECTION>` display changes according to the following illustration. When a touch pad switch is pressed, the `<BUTTON>` displays appear on the right side one by one.
The parameters appear on the center of the display. To exit the subtest, press the IPS <BUTTONS> at the same time.



Subtest 05 USB test

This subtest checks USB. The USB TEST Module (ZD0003P01) and USB Cable (ZD0003P02) must be connected to the computer.

The following message will appear. Select a port to be tested and press **Enter**.

```
Test port number select (1:Port0, 2:Port1) ?
```

If the test ends successfully, OK is displayed. If nothing is displayed, there may be a problem with the USB port.
Check the connection of the wraparound connector and repeat the test.

Subtest 07 Internet/Mail key

This subtest checks moving of the Internet key and Mail key.

The following message will appear.

```
Press [Internet] key

Press [Mail] key
```

## 3.7 Display Test

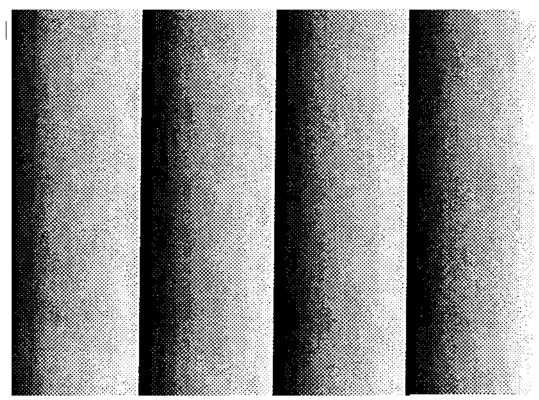
To execute the Display Test, select 4-DISPLAY TEST from the DIAGNOSTIC TEST MENU, press **Enter** and follow the directions on the screen. The Display test contains seven subtests that test the display in various modes. Move the highlight bar to the subtest you want to execute and press **Enter**.

Subtest 01 VRAM Read/Write for VGA

This subtest writes the constant data (AAh and 55h) and the address data to the video RAM (16MB). The data is read and compared to the original data.

Subtest 02 Gradation for VGA

This subtest displays four colors: red, green, blue and white from left to right across the screen from black to maximum brightness. The display below appears on the screen when this subtest is executed.



To exit this subtest and return to the DISPLAY TEST menu, press **Enter**.

Subtest 03 Gradation for LCD

This subtest displays bands of gradations for mixed colors, then for red, green, and blue. Next, it displays eight solid colors full screen: red, semi-red, green, semi-green, blue, semi-blue, white, and semi-white. Each color displays for three seconds.

Subtest 04 Gradation & Mode test for VGA

This subtest displays gradations for following modes. To change the mode, press **Enter**.

```
[Mode 12]
[Mode 13]
[Mode 3]
[Mode 111  640*480 64K]
[Mode 112  640*480 16M]
[Mode 114  800*600 64K]
[Mode 115  800*600 16M]
[Mode 117  1024*768 64K]
```

The display below appears on the screen when this subtest is executed.



*(Display example: Mode 12)*

To exit this subtest and return to the DISPLAY TEST menu, press **Enter.**

Subtest 05 All Dot On /Off for LCD

This subtest displays an all-white screen then an all-black screen. The display changes automatically every three seconds.

Subtest 06 “H” Pattern Display

This subtest displays a full screen of “H” patterns.

```
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
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HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH
```

To exit this subtest and return to the DISPLAY TEST menu, press **Enter.**

> ***NOTE****: The last row may not be completely filled. This condition does not indicate an error.*

Subtest 07 LCD Brightness

The LCD brightness changes in the following order:

Super-Bright → Bright → Semi-Bright→ Bright → Super-Bright

## 3.8 USB Floppy Disk Test

> ***COUTION**: Before running the floppy disk test, prepare a formatted work disk. Remove the Diagnostics Disk and insert the work disk into the FDD. Otherwise, the contents of the floppy disk will be erased.*

To execute the Floppy Disk Test, select 5-FLOPPY DISK TEST from the DIAGNOSTIC TEST MENU, press **Enter.**

1. The following message will appear. Select the start track of the floppy disk drive to be tested then press **Enter.**

```
Test start track (Enter:0/dd:00-79)
```

2. The Floppy Disk test contains five subtests that test the FDD.
   The floppy disk test menu will appear after you select FDD test parameters.

```
SUB-TEST MENU:

01-Sequential read
02-Sequential read/write
03-Random address/data
04-Write specified address
05-Read specified address
99-Exit to DIAGNOSTIC TEST MENU
```

Select the number of the subtest you want to execute and press **Enter**. The following message will appear during the floppy disk test.

```
Floppy Disk    XXXXXXX

SUB-TEST

PASS COUNT:XXXXX   ERROR COUNT:XXXXX
WRITE DATA:XXXXX   READ DATA  :XX
ADDRESS   :XXXXXX  STATUS     :XXX
```

```
xxx DIAGNOSTIC TEST VX.XX
[Ctrl]+[Break]   ;test end
[Ctrl]+[C]        ;key stop
```

Subtest 01 Sequential Read

This subtest performs a Cyclic Redundancy Check (CRC) that continuously reads all the tracks (track: 0 to 39/0 to 79) on a floppy disk.

The start track is specified at the start of the FDD test. Refer to 2.in this chapter.

Subtest 02 Sequential Read/Write

This subtest continuously writes data pattern B5ADADh to all the tracks (track: 0 to 39/0 to 79) on a floppy disk. The data is then read and compared to the original data.

Subtest 03 Random Address/Data

This subtest writes random data to random addresses on all tracks (track: 0 to 39/0 to 79) on a floppy disk. The data is then read and compared to the original data.

Subtest 04 Write Specified Address

This subtest writes the data specified by an operator to a specified track, head, and address.

Subtest 05 Read Specified Address

This subtest reads data from a track, head, and address specified by an operator.

## 3.9 Hard Disk Test

To execute the Hard Disk Test, select 8-HARD DISK TEST from the DIAGNOSTIC TEST MENU, press **Enter,** and follow the directions on the screen. The hard disk test contains eight subtests that test the hard disk drive functions.

> ***COUTION**: The contents of the hard disk will be erased when subtest 02, 03, 04, 06, 09 or 10 is executed. Before running the test, the customer should transfer the contents of the hard disk to another one by executing BACKUP.EXE or others.*

The following messages will appear after selecting the hard disk test from the DIAGNOSTIC TEST MENU.

1. Select the hard disk test drive number to be tested.

   ```
   Test drive number select   (1:HDD#1,2:HDD#2,0:HDD1&2)
   ```

2. This message is used to select the retry operation when the hard disk controller detects an error. Select **yes** or **no**.

   ```
   HDC F/W error retry        (1:yes,2:no)
   ```

3. This message is used to select the error dump operation when a data compare error is detected. Select **yes** or **no**.

   ```
   Data compare error dump    (1:No,2:Yes)
   ```

4. This message is used to select whether or not the HDC status is displayed on the screen. The HDC status is described in section 3.18. Select yes or no.

```
Detail status display    (1:No,2:Yes)
```

5. After setting is completed, select the number of the subtest and press **Enter**. The following message will appear.

```
HDD DISK TEST IN PROGRESS  XXXXXXX

SUB-TEST:XX

PASS COUNT:XXXXX   ERROR COUNT:XXXXX
WRITE DATA:XXXXX   READ DATA  :XX
ADDRESS   :XXXXXX  STATUS     :XXX
```

```
xxx DIAGNOSTIC TEST VX.XX
[Ctrl]+[Break]   ; test end
[Ctrl]+[C]       ; key stop
```

The first three digits of the ADDRESS indicate which cylinder is being tested, the fourth digit indicates the head and the last two digits indicate the sector.

The first digit of the STATUS number indicates the drive number being tested and the last two digits indicate the error status code as explained in Table 3-2.

Subtest 01 Sequential read

This subtest is a sequential reading of all the tracks on the HDD starting at track 0 to maximum track. When all the tracks on the HDD have been read, the test starts at the maximum track and reads the tracks on the HDD sequentially back to track 0.

Subtest 02 Address uniqueness

This subtest writes unique address data to each sector of the HDD track-by-track. The data written to each sector is then read and compared with the original data. There are three ways the HDD can be read:

```
1.  Forward sequential
2.  Reverse sequential
3.  Random
```

Subtest 03 Random address/data

This subtest writes random data in a random length to random addresses. This data is then read and compared to the original data.

Subtest 04 Cross Talk & Peak Shift

This subtest writes eight types of worst pattern data (listed below) to a cylinder, then reads the data while moving from cylinder to cylinder (to check the data interference in the neighbor track) to compare. After the third pass, it tests the motor-off function (HDD motor is turned off, stops for 20 minutes and is turned on).

| Worst pattern data | Cylinder |
|---|---|
| 'B5ADAD' | 0 cylinder |
| '4A5252' | 1 cylinder |
| 'EB6DB6' | 2 cylinder |
| '149249' | 3 cylinder |
| '63B63B' | 4 cylinder |
| '9C49C4' | 5 cylinder |
| '2DB6DB' | 6 cylinder |
| 'D24924' | 7 cylinder |

Subtest 06 Write Specified Address

This subtest writes specified data to a specified cylinder and head on the HDD.

Subtest 07 Read Specified Address

This subtest reads data which has been written to a specified cylinder and head on the HDD.

Subtest 09 Sequential Write

This subtest writes specified 2-byte data to all of the cylinders on the HDD.

Subtest 10 W-R-C Specified Address

This subtest writes data to a specified cylinder and head on the HDD, then reads the data and compares it to the original data.

## 3.10 Real Timer Test

To execute the Real Timer Test, select 9-REAL TIMER TEST from the DIAGNOSTIC TEST MENU, press **Enter** and follow the directions on the screen. The real timer test contains three subtests. Move the highlight bar to the subtest you want to execute and press **Enter**.

Subtest 01 Real Time

A new date and time can be input during this subtest. To execute the real time subtest follow these steps:

Step 1: Select subtest 01 and the following message will appear:

```
Current date : XX-XX-XXXX
Current time : XX:XX:XX
Enter new date:

PRESS [ENTER] KEY TO EXIT TEST
```

Step 2: If the current date is not correct, input the correct date and press **Enter**. The date is updated and the following prompt will appear:

```
Enter new time :
```

Step 3: If the current time is not correct, input the correct time in 24-hour format and press **Enter**. The time is updated.

The date and the time are displayed alternately by pressing **Enter**. To exit, press **Ctrl + Break**.

Subtest 02 Backup Memory

This subtest checks the following backup memories:

Writes 1-bit of "on" data (01h through 80h) to address 0Eh through 7Fh

Writes 1-bit of "off" data (FEh through 7Fh) to address 0Eh through 7Fh

Writes the data pattern AAh and 55h to the address 0Eh to 7Fh

Then the subtest reads and compares this data with the original data.

Subtest 03 Real Time Carry

> ***CAUTION****: When this subtest is executed, the current date and time are erased.*

This subtest checks the real time clock increments. Make sure the date and time are displayed in the following format and they move forward correctly.

```
Current date  :  12-31-1999
Current time  :  23:59:58

PRESS [Enter] KEY TO EXIT TEST
```

Press **Enter** to exit.

## 3.11 NDP Test

To execute the NDP test, select 10-NDP TEST from the DIAGNOSTICS TEST MENU, press **Enter** and follow the directions on the screen. The NDP test contains one subtest.

Subtest 01 NDP

This test checks the following functions of NDP:

- ❑ Control word
- ❑ Status word
- ❑ Bus
- ❑ Addition
- ❑ Multiplication

Press **Ctrl + Break** to exit.

## 3.12 Expansion Test

To execute the expansion test, select 11-EXPANSION TEST from the DIAGNOSTICS TEST MENU, press **Enter** and follow the directions on the screen. The expansion test contains two subtests.

> ***NOTE:*** *To execute this subtest, the PC card wraparound connector is required.*

Subtest 01 PCMCIA Wraparound

This test checks the following signal line of the PC card slot:

- Address line
- REG#, CE#1, CE#2 line
- Data line
- Speaker line
- Wait line
- BSY#, BVD1 line

This subtest is executed in the following order:

| Sub# | Address | Good | Bad | Contents |
|---|---|---|---|---|
| 01 | 00001<br>00001 | nn<br>nn | xx<br>xx | Address line<br>REG#, CE#1, CE#2<br>nn=A0, 90, 80, 00 |
| 02 | 00002 | ww | rr | Data line<br>ww=write data, rr=read data |
| 03 | 00003 | — | — | Speaker line |
| 04 | 00004 | 40,80 | xx | Wait line (40<xx<80) |
| 05 | 00005 | nn | xx | Other lines (BSY#, BVD1)<br>NN=21, 00 |

> ***NOTE****: When selecting the subtest number 01, the following message will appear. Specify the slot you want to use.*
>
> `Test slot number select (1:slot0, 2:slot1, 0:slot0&1)?`
>
> *Select the number.*

Subtest 03 RGB monitor ID test

Connect a CRT monitor for this subtest. This subtest is conducted with VESA commands.

## 3.13 Wireless LAN Test (Agere)

This section describes how to perform the wireless LAN transmitting-receiving test with the test program.

> ***NOTE:*** *Use another computer (with Agere wireless LAN card) that can communicate by the wireless LAN as a reference machine to perform this test.*

To start the Wireless LAN test program, follow the steps below:

> ***NOTE:*** *1) Before starting the wireless LAN test, make sure the Wireless Communication Switch on the left side of the computer is turned on. (The Wireless Communication LED lights orange.)*
> *2) Release the write-protection of the floppy disk for the test.*

Insert a floppy disk containing the test program into the target machine and turn on the target machine. The Wireless LAN test menu will appear.

```
###############################################################
####      Wireless LAN sub system repair test  VX.XX      ####
###############################################################
*                                                             *
*         1  Transmit & Receive test [Responder]              *
*         2  MAC Address test [Mini-PCI Wireless LAN]         *
*         3  Wireless LAN (WEP64/128) test                    *
*                                                             *
*         0  Transmit & Receive test [Initiator]              *
*                                                             *
**************************************************************

....Press test number [1-3,0]  ?
```

Press 1, 2 or 3, and the **Enter** to perform the corresponding sub test. To quit the Wireless LAN test program, eject the floppy disk and turn the computer off while the menu above is displayed.

Subtest 01 Transmit & Receive test

This sub test checks transmit and receive functions.

### Transmit test

Press **1** to select the test and press **Enter** in the target machine as a responder. The following message will appear:

```
################################################################
####      Wireless LAN sub system repair test  VX.XX       ####
################################################################
*                                                              *
*        1  Transmit & Receive test [Responder]                *
*        2  MAC Address test [Mini-PCI Wireless LAN]           *
*        3  Wireless LAN (WEP64/128) test                      *
*                                                              *
*        0  Transmit & Receive test [Initiator]                *
*                                                              *
****************************************************************

....Press test number [1-2,0]  ?1

======== RESPONDER SET ========

ORiWL.EXE Rev.03 Copyright (c) Toshiba Corporation,2000, 2001
Initializing...

[[[ Responder Mode ]]]

MAC adress : XXXXXXXXXXXX
Ad-hoc mode
      SS ID : PHN Test
      Channel : 10
      Tx ratio : 2 Mbps
```

To prepare the tester machine for the Wireless LAN test program, insert a floppy disk containing the test program into the tester machine and turn on the tester machine. The Wireless LAN test menu will appear.

Press **0** to select the test and press **Enter** in the initiator machine. The following message will appear:

```
###############################################################
####      Wireless LAN sub system repair test  VX.XX      ####
###############################################################
*                                                             *
*        1  Transmit & Receive test [Responder]               *
*        2  MAC Address test [Mini-PCI Wireless LAN]          *
*                                                             *
*        0  Transmit & Receive test [Initiator]               *
*                                                             *
***************************************************************

....Press test number [1-2,0]  ?1

======== RESPONDER SET ========

ORiWL.EXE Rev.03 Copyright (c) Toshiba Corporation,2000, 2001
Initializing...

[[[ Responder Mode ]]]

MAC address : XXXXXXXXXXXX
Ad-hoc mode
      SS ID : PHN Test
      Channel : 10
      Tx ratio : 2 Mbp
      PASS : 134 ERROR : 0
```

When the machine has passed the test, "OK" message will appear in the test machine.




Then press **Enter** in the target machine; the "OK" message will appear also in the target machine.

Press **Enter** to return to the main menu.

### Receive test

In receive test reverse the procedures of the transmit test. To prepare the tester machine for the Wireless LAN test program, insert a floppy disk containing the test program into the tester machine and turn on the tester machine. The Wireless LAN test menu will appear.

Press **1** to select the test and press **Enter**. The following message will appear:

```
##############################################################
####      Wireless LAN sub system repair test  VX.XX      ####
##############################################################
*                                                            *
*         1  Transmit & Receive test [Responder]             *
*         2  MAC Address test [Mini-PCI Wireless LAN]        *
*         3  Wireless LAN (WEP64/128) test                   *
*                                                            *
*         0  Transmit & Receive test [Initiator]             *
*                                                            *
**************************************************************

....Press test number [1-2,0]  ?1

======== RESPONDER SET ========

ORiWL.EXE Rev.03 Copyright (c) Toshiba Corporation,2000, 2001
Initializing...

[[[ Responder Mode ]]]

MAC address : XXXXXXXXXXXX
Ad-hoc mode
      SS ID : PHN Test
      Channel : 10
      Tx ratio : 2 Mbps
      PASS : 134 ERROR : 0
```

Press **0** to select the test and press **Enter** in the target machine. The following message will appear:

```
##############################################################
####      Wireless LAN sub system repair test  VX.XX      ####
##############################################################
*                                                            *
*         1  Transmit & Receive test [Responder]             *
*         2  MAC Address test [Mini-PCI Wireless LAN]        *
*         3  Wireless LAN (WEP64/128) test                   *
*                                                            *
*         0  Transmit & Receive test [Initiator]             *
*                                                            *
**************************************************************

....Press test number [1-2,0]  ?1

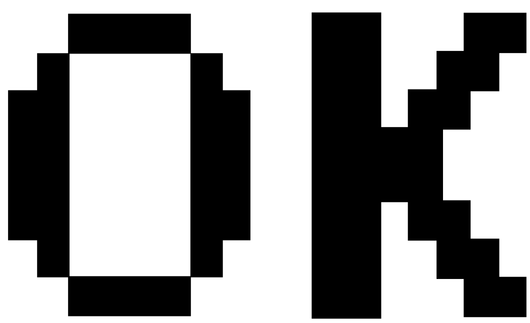
======== RESPONDER SET ========

ORiWL.EXE Rev.03 Copyright (c) Toshiba Corporation,2000, 2001
Initializing...

[[[ Responder Mode ]]]

MAC address : XXXXXXXXXXXX
Ad-hoc mode
      SS ID : PHN Test
      Channel : 10
      Tx ratio : 2 Mbps
```

When the machine has passed the test, “OK” message will appear in the target machine.




Then press **Enter** in the test machine; the “OK” message will appear also in the test machine.

Press **Enter** to return to the main menu.

Subtest 02 Mac Address test

This subtest reads MAC Address. If there is no problem, the "OK" message will appear.

Subtest 03 Wireless LAN (WEP64/128) test

This subtest reads the WEP of the wireless LAN card installed in the target machine. A message similar to the following will appear:

```
****** This CARD is WEP ******
Press any key to continue
```

## 3.14 Wireless LAN Test (Atheros)

This section describes how to perform the wireless LAN transmitting-receiving test with the test program.

> ***NOTE:*** *Use another computer (with Atheros wireless LAN card) that can communicate by the wireless LAN as a responder machine to perform this test.*

In this test, the following items are tested:

* Test PC [Initiator] side
    (1) SKU (destination code) check
    (2) Mac Address check
    (3) Communication test (802.11a Main antenna)
    (4) Communication test (802.11a Sub antenna)
    (5) Communication test (802.11b)

* [Responder] side
    (1) Communication test (802.11b)

This program conducts the above test items continuously and displays results for each item during the test. However, only the last result for the whole test shall be checked. (The message "OK" or "NG" is displayed.)

When an "NG" item is detected during the test, the message "NG" is displayed on the screen and the test stops.

> ***NOTE:*** *This program takes a long time until the test ends.*

To start the Wireless LAN test program, follow the steps below:

> ***NOTE:*** *Before starting the wireless LAN test, make sure the Wireless Communication Switch on the left side of the computer is turned on. (The Wireless Communication LED lights orange.)*

### Setting the responder machine

> ***NOTE:*** *Release the write-protection of the floppy disk for the test.*

Insert a floppy disk containing the test program into the FDD for the responder machine and turn on the responder machine. The Wireless LAN test menu will appear.

```
################################################################
####      Atheros WLAN sub system repair test  VX.XX       ####
################################################################
*                                                              *
*         1 .....Test PC [Initiator]                           *
*                                                              *
*         0 .....[Responder]                                   *
*                                                              *
****************************************************************

....Press test number [1,0] ?
```

Press **0** and **Enter** in the responder machine. After a while, the following messages will appear. The latter message is updated ever 3 seconds.

```
Waiting for transmitter to ring the bell in 11a mode.

Input or output error (EIO) : rxDatBegin : nothing receive within
3000millisecs(waitTime)
```

The responder machine is ready for the test.

### Setting the tester machine

> ***NOTE:*** *Release the write-protection of the floppy disk for the test.*

Insert a floppy disk containing the test program into the FDD of the tester machine and turn on the tester machine. The Wireless LAN test menu will appear.

```
################################################################
####      Atheros WLAN sub system repair test  VX.XX       ####
################################################################
*                                                              *
*         1 .....Test PC [Initiator]                           *
*                                                              *
*         0 .....[Responder]                                   *
*                                                              *
****************************************************************

....Press test number [1,0] ?
```

Press **1** and **Enter** in the tester machine. After a while, the following message will appear:

```
--------------------------------------------
-                                          -
-         mac address check OK !!          -
-                                          -
-         ...Press any key !!              -
-                                          -
--------------------------------------------
```

To proceed the test, press any key.

When the tester machine has passed the test, "OK" message will appear in the tester machine.

```
OK
```

Press **Enter** to return to the main menu.

When the tester machine has not passed the test, "NG" message will appear in the tester machine. Pressing **Enter** on the screen shows the following message.

```
*************************************************************
*                                                           *
*      8.02 11a Tx Test AUX Antenna NG                      *
*                                                           *
*************************************************************
```

Then the test returns to the main menu automatically.

## 3.15 Wireless LAN Test (Calexico)

This section describes how to perform the wireless LAN transmitting-receiving test with the test program.

> ***NOTE**: Use another computer (with Calexico wireless LAN card) that can communicate by the wireless LAN as a reference machine to perform this test. An access point is also required.*

In this test, the following items are tested.

(1) Communication test (Main antenna, Aux antenna)

(2) MAC address Check

To start the Wireless LAN test program, follow the steps below:

> ***NOTE**: Before starting the wireless LAN test, make sure the Wireless Communication Switch on the left side of the computer is turned on. (The Wireless Communication LED lights orange.) Release the write-protection of the floppy disk for the test.*

### Setting the responder machine

Connect the responder machine to the access point with a cross cable and turn on the access point.

Insert the floppy disk containing the wireless LAN test program into the USB FDD of the responder machine and turn on the responder machine. Then wait until the following message appears.

### Setting the target machine

Insert the floppy disk containing the wireless LAN test program into the USB FDD of the target machine and turn on the target machine. Then the test starts automatically.

When the machine has passed the test, "OK !" message will appear on the target machine.

Press any key to exit the test.

When an error is detected during the test, "NG !" massage will appear. Press any key to display the NG item (Main antenna, Aux. antenna or MAC address check). The following message appears.

```
*************************************************************
*                                                           *
*                Main Antenna Test:  NG !!                  *
*                                                           *
*************************************************************
```

## 3.16 Sound/LAN/Modem Test

To execute the Sound/LAN/Modem Test, use the Test Diagnostics disk (No.2). Finish the tests of the Diagnostics disk (No.1) by selecting 99 - EXIT TO DIAGNOSTICS MENU in the DIAGNOSTIC TEST MENU. Then in the DIAGNOSTICS MENU, select 9 - EXIT TO MS-DOS.

Insert the Test program disk (No.2) in the floppy disk drive and turn on the power. The following message will appear:

```
###################################################################
#######   GUAM DIAGNOSTICS PROGRAM (SOUND/LAN/MODEM TEST)    #######
###################################################################
*                                                                 *
*   1 ...........  (Microphoned recording&play)                   *
*   2 ...........  (Sin wave)                                     *
*   3 ...........  (LAN)                                          *
*   4 ...........  (MODEM)                                        *
*******************************************************************
.... Press test number[1-4] ?
```

Press the number you want to test and press **Enter.**

Subtest 01 Microphoned recording & play

This subtest checks the function of the CODEC A/D D/A converter. Both the microphone and headphone terminal can be checked at the same time.

Before executing this subtest, connect an external microphone to the computer. If necessary, connect a headphone to the computer to check whether the headphone jack of the computer is working properly.

When the subtest is selected, the following message appears.

```
....Press test number[1-4] ? pause
```

Press any key, and the following two messages appear.

```
Press any key to continue...
....Press test number[1-4] ? call micrec
```

The sound is recorded for five seconds automatically from the microphone. After the recording is completed, the computer immediately plays back the sound recorded. When the playing is finished, a message similar to the one below appears.

```
Completing     SoundMAX/ICH microphone capture test
End time       XXX XXX XX XX*XX:XX XXXX
System Status  0x0

Performing SoundMAX/ICH play buffer to line out
Start Time:    XXX XXX XX XX:XX:XX XXXX

Play to destination is LINEOUT
Volume requested is X.XXX dB
Play from buffer name is BUFFER0
Requested play time is 5.000 seconds.
Actual play time will be 5.000 seconds.

Completing SoundMAX/ICH play buffer to line out
End Time XXX XXX XX :XX:XX XXXX
System Status 0x0

Test completed at XXX XXX XX :XX:XX XXXX
System completion code was 0x0
```

Then, the screen returns to the main menu and the following message will appears.

```
....Press test number[1-4] ?
```

To execute a subtest continuously, select the test number and press **Enter**. To exit the Sound/LAN/Modem test, remove the test program disk from the USB FDD and turn off the computer.

Subtest 02 Sin Wave

This subtest is executed by the load format of COM file (ADSIN.COM). The program expands sin wave data table to data in 16-64KB, and creates play data (It sounds like continuous beep). By using wave measuring devices such as an oscilloscope, this program can read sine wave without expanding.

When the subtest is executed, the following message appears.

```
....Press test number[1-4] ? pause
Press any key to continue...
```

Press any key, and the following message appears. Then sin wave is expanded to 16-64KB data and is played.

```
....Press test number[1-4] ? call sin
```

When the beep sound finished, the screen returns to the main menu and the following massage appears.

```
....Press test number [1-4] ?
```

To execute a subtest continuously, select the test number and press **Enter.** To exit the Sound/Modem test, remove the test program disk from the USB FDD and turn the computer off.

Subtest 03 LAN

This subtest checks the operation of mini-PCI I/F by the loopback in the chip.

The large “OK” is displayed if no error occurred.

Subtest 04 MODEM

For this subtest, connect the modem PCB and RJ11 connector with a harness. This subtest contains the following tests. They are tested with the dedicated “FAT-MODE inspection device(Product Code QE2000P01 made by Nittou Denki Seisakusyo)

- Scorpio Modem Initialize
- Digital Loopback Test
- Modem Sound Test
- External Loopback test
- RJ11 Connector Test (LED)

To finish the Sound/LAN/Modem test, the power of the computer is turned off.

## 3.17 Error Status Code

Table 3-2 lists the error status codes for the Diagnostic Test.

*Table 3-2 Error status codes names (1/2)*

| Device name | Error code | Error status name |
|---|---|---|
| (Common) | FF | Data Compare Error |
| System | 01<br>02<br>03<br>04<br>FE<br>0A<br>0B<br>88 | ROM Checksum Error<br>Location ID Error<br>Serial ID Writer Error<br>Thermistor Error<br>EC read Error<br>LAN loopback Error<br>1394 date Error<br>FAN test Error |
| Memory | 01<br>02<br>14<br>DD<br>DE<br>DF | Parity error<br>Protected mode not change<br>Memory write/read error<br>Cache memory error<br>2nd Cache error<br>TAG-RAM error |
| Keyboard | 01<br>02<br>03<br>04<br>05<br>06 | Mouse interface error<br>IPS interface error<br>Interface error<br>Retransmit error<br>Mouse handler not support<br>PS/2 mouse & IPS not |
| FDD | 01<br>02<br>03<br>04<br>06<br>08<br>09<br>10<br>20<br>40<br>60<br>80<br>EE | Bad Command Error<br>Address Mark Not Found<br>Write Protected<br>Record Not Found<br>Media Removed<br>DMA Overrun Error<br>DMA Boundary Error<br>CRC Error<br>FDC Error<br>Seek Error<br>Not Drive Error<br>Time Out Error<br>Write Buffer Error |

*Table 3-2 Error status codes names (2/2)*

| Device name | Error code | Error status name |
|---|---|---|
| HDD | 01 | Bad Command Error |
| | 02 | Address Mark Not Found |
| | 04 | Record Not Found |
| | 05 | HDC Not Reset Error |
| | 07 | Drive Not Initialized |
| | 08 | HDC overrun (DRQ) |
| | 09 | DMA Boundary Error |
| | 0A | Bad Sector |
| | 0B | Bad Track Error |
| | 10 | ECC Error |
| | 11 | ECC recover enable |
| | 20 | HDC Error |
| | 40 | Seek Error |
| | 80 | Time Out Error |
| | AA | Drive Not Ready |
| | BB | Undefined Error |
| | CC | Write Fault |
| | E0 | Status Error |
| | EE | Access Time Out Error |
| | DA | No HDD |
| PCMCIA | C1 | ADDRESS LINE ERROR |
| | C2 | REG# LINE ERROR |
| | C3 | CE#1 LINE ERROR |
| | C4 | CE#2 LINE ERROR |
| | C5 | DATA LINE ERROR |
| | C6 | WAIT LINE ERROR |
| | C7 | BSY# LINE ERROR |
| | C8 | BVD1 LINE ERROR |
| | CB | ZV Port ERROR |
| | CD | NO PCMCIA |
| NDP | 01 | No Co-Processor |
| | 02 | Control Word Error |
| | 03 | Status Word Error |
| | 04 | Bus Error |
| | 05 | Addition Error |
| | 06 | Multiplay Error |

## 3.18 HDC Status

When an error occurs in the hard disk test, the following message is displayed:

```
HDC status = XXXX
```

The hard disk test error status is displayed on the screen by a four-digit number.

The hard disk controller error status is composed of two bytes; the first byte displays the contents of the HDC error status register and the second byte displays the HDC error register. Each of them are indicated in hexadecimal form

The contents of the HDC error status register and error register are listed in Tables 3-3 and 3-4.

*Table 3-3 Hard disk controller status register contents*

| Bit | Name | Description |
|---|---|---|
| 7 | BSY<br>(Busy) | "0" … HDC is ready.<br>"1" … HDC is busy. |
| 6 | DRDY<br>(Drive ready) | "0" … Hard disk drive is not ready to accept any command.<br>"1" … Hard disk drive is ready. |
| 5 | DWF<br>(Drive write fault) | "0" … DWF error is not detected.<br>"1" … Write fault condition occurred. |
| 4 | DSC<br>(Drive seek complete) | "0" … The hard disk drive heads are not settled over a track.<br>"1" … The hard disk drive heads are settled over a track. |
| 3 | DRQ<br>(Data request) | "0" … Drive is not ready for data transfer.<br>"1" … Drive is ready for data transfer. |
| 2 | CORR<br>(Corrected data) | "0" … Not used<br>"1" … Correctable data error is corrected. |
| 1 | IDX<br>(Index) | "0" … Not used<br>"1" … Index is sensed. |
| 0 | ERR<br>(Error) | "0" … Normal<br>"1" … The previous command was terminated with an error. |

*Table 3-4 Error register contents*

| Bit | Name | Description |
|---|---|---|
| 7 | BBK<br>(Bad block mark) | “0” … Not used<br>“1” … A bad block mark is detected. |
| 6 | UNC<br>(Uncorrectable) | “0” … There is no uncorrectable data error.<br>“1” … Uncorrectable data error has been detected. |
| 5 | —— | Not used |
| 4 | IDN<br>(Identification) | “0” … Not used<br>“1” … There was no ID field. |
| 3 | —— | Not used |
| 2 | ABT<br>(Abort) | “0” … Not used<br>“1” … Illegal command error or a command abort. |
| 1 | TK0<br>(Track zero) | “0” … The hard disk detected track 0.<br>“1” … The hard disk could not detect track 0. |
| 0 | —— | Not used. |

# 3.19 FDD Cleaning

## 3.19.1 Function Description

This function cleans the heads in the 3.5-inch FDD by executing a series of head load/seek and read operations. A cleaning disk is necessary to perform this program.

## 3.19.2 Operations

1. Selecting test 4-HEAD CLEANING from the DIAGNOSTIC MENU and pressing **Enter** displays the following messages:

   ```
   DIAGNOSTICS - FLOPPY DISK HEAD CLEANING : V6.00

   Mount cleaning disk(s) on drive(s).

   Press any key when ready.
   ```

2. Remove the Diagnostics Disk from the FDD, then insert the cleaning disk and press **Enter**.

3. When the following message appears, the FDD head cleaning has begun.

   ```
   Cleaning start
   ```

4. The display automatically returns to the DIAGNOSTIC MENU when the program is completed.

# 3.20 Log Utilities

## 3.20.1 Function Description

This function logs error information generated while a test is in progress and stores the results in RAM. This function can also store data on a floppy disk or output the data to a display or a printer.

If the power switch is turned off, the error information will be lost. The error information is displayed in the following order:

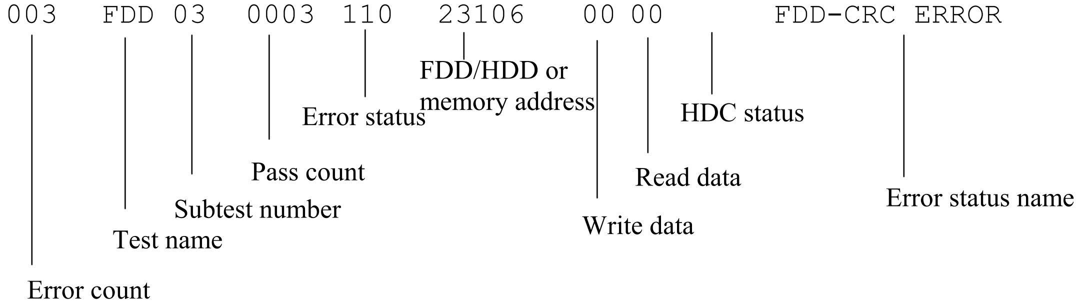
1. Error count (CNT)
2. Test name, Subtest number (TS-No)
3. Pass count (PASS)
4. Error status code (STS)
5. FDD/HDD or memory address (ADDR)
6. Write data (WD)
7. Read data (RD)
8. HDC status code (HSTS)
9. Error status name (ERROR STATUS NAME)

### 3.20.2 Operations

Selecting 5-LOG UTILITIES and pressing **Enter** in the DIAGNOSTIC MENU logs error information into RAM or onto a floppy disk. The error information is displayed in the following format:

```
      0003 ERRORS
CNT   TS-No    PASS  STS   ADDR     WD RD HSTS  [ERROR STATUS NAME]

001   FDD 01   0000  110   24015    00 00       FDD-CRC ERROR
002   FDD 01   0001  110   30108    00 00       FDD-CRC ERROR
003   FDD 03   0003  110   23106    00 00       FDD-CRC ERROR
```




```
[[1:Next,2:Prev,3:Exit,4:Clear,5:Print,6:FD Log Read,7:FD Log Write]]
```

2. The error information displayed on the screen can be manipulated by the following number keys:

   The **1** key scrolls the display to the next page.
   The **2** key scrolls the display to the previous page.
   The **3** key returns to the Diagnostic Menu.
   The **4** key erases all error log information in RAM.
   The **5** key outputs the error log information to a printer.
   The **6** key reads the log information from a floppy disk.
   The **7** key writes the log information to a floppy disk.

3. In the case of "error retry OK," a capital "R" will be placed at the beginning of the error status. However, it is not added to the error count.

# 3.21 Running Test

## 3.21.1 Function Description

This function automatically executes the following tests in sequence:

1. System test (subtest 01)
2. Memory test (subtests 01,02, 04)
3. Display test (subtest 01)
4. FDD test (subtest 02)
5. HDD test (subtests 01)
6. Real timer test (subtest 02)

The system automatically detects the number of floppy disk drives connected to the computer for the FDD test.

## 3.21.2 Operations

> ***COUTION****: Do not forget to load a formatted work disk in the FDD. If a work disk is not loaded, an error will be generated during the FDD testing.*

1. Remove the diagnostics disk from the floppy disk drive and insert the formatted work disk.

2. Select 6-RUNNING TEST from the DIAGNOSTIC MENU and press **Enter.** The following message is displayed.

   ```
   Serial #A wrap around test (Y/N) ?
   ```

   Select **Y (yes)** to execute the Serial #A test or **N (NO)** not to execute, then press **Enter**. A RS-232C wraparound connector must be connected to the serial port of the computer to execute properly this test.

3. After specifying of the Serial #A test, the following message will appear:

```
Mount the work disk(s) on the drive(s),
then press [Enter] key.
[Warning : The contents of the disk(s),
will be destroyed.]
```

4. This program is executed in the above mentioned ways. To terminate the program, press **Ctrl + Break.**

# 3.22 Floppy Disk Drive Utilities

## 3.22.1 Function Description

This function formats the FDD, copies the floppy disk and displays the dump list for both the FDD and HDD.

1. FORMAT

> ***COUTION**: This program is only for testing a floppy disk drive. The option is different from the MS-DOS FORMAT command.*

This program formats the floppy disk in the following formats.

(a) 2DD: Double-sided, double-density, double-track, 96/135 TPI, MFM mode, 512 bytes, 9 sectors/track.

(b) 2HD: Double-sided, high-density, double-track, 96/135 TPI, MFM mode, 512 bytes, 18 sectors/track.

2. COPY

This program copies data from a source floppy disk to a target floppy disk.

3. DUMP

This program displays the contents of the floppy disk and the designated sectors of the hard disk.

4. HDD-ID

This program reads the hard disk ID and displays the hard disk ID, serial number and other hard disk information.

### 3.22.2 Operations

1. Selecting 7-FDD UTILITIES from the DIAGNOSTIC MENU and pressing **Enter** displays the following message:

```
[ FDD UTILITIES ]

1 - FORMAT
2 - COPY
3 - DUMP
4 - HDD-ID
9 - EXIT TO DIAGNOSTICS MENU
```

2. FORMAT program

(a) When FORMAT program is loaded, the following message is displayed:

```
DIAGNOSTICS - FLOPPY DISK FORMAT : V6.00
Drive number select (1:A, 2:B) ?
```

(b) Select a drive number to display the following message:

```
Type select (0:2DD, 3:2HD) ?
```

(c) Select a media/drive type number and press **Enter**. A message will be displayed:

```
Warning : Disk data will be destroyed.
Insert work disk into drive A:
Press any key when ready.
```

(d) Remove the Test program Disk from the FDD, insert the work disk and press any key. The following message will be displayed and the FDD format is executed:

```
[ FDD TYPE ] : TRACK  = XXX
[ FDD TYPE ] : HEAD   = X
[ FDD TYPE ] : SECTOR = XX

Format start
                   [[track, head = XXX X]]
```

After the floppy disk is formatted, the following message will appear:

```
Format complete
Another format (1:Yes/2:No) ?
```

(e) Typing **1** displays the message from step (c) above. Typing **2** returns the test to the DIAGNOSTIC MENU.

3. COPY program

   (a) When FORMAT program is loaded, the following message is displayed:

```
FLOPPY DISK FORMAT & COPY : VX.XX
Type select (0:2DD,3:2HD) ?
```

   (b) Selecting a media/drive type number will display a message below:

```
Insert source disk into drive A:
Press any key when ready.
```

   (c) Remove the Diagnostics Disk from the FDD, insert the source disk and press any key. The following message will appear, indicating the program has started.

```
[ FDD TYPE ] : TRACK  = XXX
[ FDD TYPE ] : HEAD = X
[ FDD TYPE ] : SECTOR = XX
Copy start
                 [[ track,head = XXX X ]]
```

   (d) Remove the source disk from the FDD, insert a formatted work disk and press any key. The following message will appear and start copying to the target disk.

```
Insert target disk into drive A:
Press any key when ready.

                 [[ track,head = XXX X ]]
```

   (e) When the amount of data is too large to be copied in one operation, the message from step (b) is displayed again. After the floppy disk has been copied, the following message will appear:

```
Copy complete
Another copy (1:Yes/2:No) ?
```

   (f) To copy another disk, type **1** and the message from step (a) is displayed again. Entering **2** returns the test program to the DIAGNOSTIC MENU.

4. DUMP program

(a) When DUMP program is loaded, the following message appears:

```
DIAGNOSTICS-HARD DISK & FLOPPY DISK DUMP : VX.XX
Drive type select (1:FDD, 2:HDD) ?
```

(b) Select a format type number. If 2:HDD is selected, the display will go to step (g).
If 1:FDD is selected, the following message appears:

```
Select drive number   (1:A, 2:B) ?
```

(c) Select a drive number and the following message will be displayed.

```
Format type select (1:2DD, 2:2HD) ?
```

(d) Select a format type and the following message will appear:

```
Insert source disk into drive A:
Press any key when ready.
```

(e) Select a media mode and the following message will appear:

```
Insert source disk into drive A:
Press any key when ready.
```

(f) Insert a source disk and press any key and the following message will appear:

```
—— Max. address ——
[Track ] = XXXX
[ Head ] = XX
[Sector] = XX

Track number ??
```

(g) Set the track number, the head number and the sector number you want to dump. The system will access the disk and dump a list. Then the message shown in (j) will appear.

(h) The following message will appear.

```
Select drive number   (1:C, 2:D) ?
```

(i) Select a drive number and the following message will be displayed.

```
—— Max. address ——
[LBA ] = XXXXXXXXX

LBA number ??
```

(j) Set the LBA number you want to dump. The system will access the disk and dump a list.

(k) The following message will appear. To finish the dump, select 3.

```
Press number key (1:up, 2:down, 3:end) ?
```

(l) The following message will appear. Selecting 2 returns to the FDD UTILITIES MENU.

```
Another dump (1:Yes, 2:No) ?
```

5. HDD-ID READ program

   Loading HDD ID displays the following HDD ID configuration:

```
[HDD ID Read (V5.10)] [Drive #X]
   ID code (h)               =  XXXX
   No. of Cylinders          =  XXXX XXXX
   Removable Cylinders       =  XXXX  XXXX
   No. of Heads              =  XXXX XXXX
   Unformat Bytes/Track      =  XXXX XXXX
   Unformat Bytes/Sector     =  XXXX XXXX
   Sectors/Track             =  XXXX XXXX
   Gap Length                =  XXXX XXXX
   Sync. Bytes               =  XXXX XXXX
   Reserved (h)              =  XXXX
   Serial No.                =  YYY...
   Controller Type (h)       =  XXXX
   Sector Buffers            =  XXXX XXXX
   ECC Bytes                 =  XXXX XXXX
   Firmware Rev.             =  YYYYYY..
   Model No.                 =  YYYY...
   Reserved (h)              =  XXXX
   Double Word Capability    =  XXXX XXXX

   Press [Enter] key
```

   Press **Enter** to return to the FDD UTILITIES MENU.

# 3.23 System Configuration

## 3.23.1 Function Description

The System Configuration program contains the following configuration information for the computer:

1. Processor Type
2. VGA Controller
3. MS-DOS Version
4. BIOS ROM version (1st ID, 2nd ID)
5. BOOT ROM version
6. KBC version
7. PS Micon Version
8. Total Memory Size
9. Battery Code
10. Sound System
11. The number of printer ports
12. The number of ASYNC ports
13. The number of math co-processors
14. The number of PCMCIA Slots
15. Modem Type
16. LAN Type
17. FDD Information
18. The number of HDD
19. Date/Time

### 3.23.2 Operations

1. Selecting 8-SYSTEM CONFIGURATION from the DIAGNOSTIC MENU and pressing **Enter** displays the following system configuration:

```
System Configuration Display : Ver 5.xx0 [Machine Name : 2000 ]

** -  Processor Type   =  P3 - 750 (C0)
** -  VGA Controller   =  xxxxx
*  -  MS-DOS Version   =  Vxxxx
*  -  BIOS-ROM Version =  Vxxxx 1st ID = FCH, 2nd ID = 73H
*  -  BOOT-ROM Version =  Vxxxx
*  -  KBC Version      =  Vxxxx
*  -  PS Micom Version =  Vxxxx (EC Version = V0.51)
*  -  Total Memory Size=  xxxxMB(Conventional Memory = 00639KB)
*  -  Battery Code     =
** -  Sound System     =  M1535
*  -  0 Printer Adapter   LPT1 =    LPT2 =    LPT3 =
*  -  0 ASYNC Adapter         COM1 = XXX COM2 =    COM3 =
*  -
*  -  1 Math Co-Processor
*  -  1 PCMCIA Slot
*  -    Modem / LAN   = None
*  -  1 Floppy Disk Drive(s)   Track =000     Sector =18
*  -  1 Hard Disk Drive(s)  #1 Sectors   = 0009780750 (05007MB)
                             #2 Sectors   =            (       MB)
*  -
Press Enter Key         [Date = YYYY-MM-DD, HH:MM:SS]
```

2. Press **Enter** to return to the DIAGNOSTIC MENU.

# 3.24 SETUP

## 3.24.1 Function Description

This program displays the current system setup information as listed below:

1. Memory
    (a) Total
2. System Date/Time
    (a) System Date
    (b) System Time
3. Battery
4. Password
5. HDD Password
    (a) HDD
    (b) HDD Password mode
    (c) User Password
6. Boot Priority
    (a) Boot Priority
    (b) HDD Priority
    (c) Network Boot Protocol
7. Display
8. Others
    (a) CPU Cache
    (b) Level 2 Cache
    (c) Dynamic CPU Frequency Mode
    (d) Auto Power On
9. Configuration
10. Drives I/O
11. PCI Bus
12. PC card
13. Peripheral
    (a) Internal Pointing Device
    (b) Hard Disk Mode
14. LEGACY Emulation
    (1) USB KB/Mouse Legacy Emulation
    (2) USB-FDD Legacy Emulation
15. PCI LAN

### 3.24.2 Accessing the SETUP Program

Selecting 0-SETUP from the DIAGNOSTICS MENU and pressing **Enter** displays the followings:

```
                          SYSTEM SETUP (1/2)       ACPI BIOS version = X.XX
MEMORY                                    BOOT PRIORITY
Total                 =  XXXXXKB          Boot Priority = HDD→FDD→CD-ROM→LAN
                                          HDD Priority  = Built-in HDD→PC Card
SYSTEM DATE/TIME                          Network Boot Protocol = PXE
Date (MM-DD-YYYY)    = XX-XX-XXXX
Time (HH:MM:SS)      = XX:XX:XX           DISPLAY
                                          Power On Display    = Auto-Selected
BATTERY
Battery Save Mode    = Full Power         OTHERS
                                          CPU Cache           = Enabled
PASSWORD                                  Level 2 Cache       = Enabled
Not Registered                            Dynamic CPU Frequency Mode
                                                      = Dynamically Switchable
HDD PASSWORD                              Auto Power On       = Disabled
HDD                  = Built-in HDD
HDD Password Mode    = User Only
User Password        = Not Registerd
↑↓→←: Select items  Space, BkSp: Change values  PgDn, PgUp: Change pages
Esc: Exit without saving  Home : Set default values  End: Save changes and Exit
```

```
                          SYSTEM SETUP (2/2)       ACPI BIOS version = X.XX
CONFIGURATION                             PC CARD
Device Config. = Setup by OS              Controller Mode = Auto-Selected

DRIVES I/O                                PERIPHERAL
Built-in HDD                              Internal Pointing Device = Enabled
          = Primary IDE(1F0H/IRQ14)       Hard Disk Mode  = Enhanced IDE(Normal)
PC Card   = Other(190H/IRQ10)
                                          LEGACY EMULATION
PCI BUS                                   USB KB/Mouse Legacy Emulation
PCI BUS        = IRQ11                                         = Enabled
                                          USB-FDD Legacy Emulation = Enabled

                                          PCI LAN
                                          Built-in LAN    = Enabled
↑↓→←: Select items  Space, BkSp: Change values  PgDn, PgUp: Change pages
Esc: Exit without saving  Home : Set default values  End: Save changes and Exit
```

### Moving Within the SETUP Menu and Changing Values

1. Press ← and → to move between the columns horizontally. Press ↑ and ↓ to move between items in a column. Press **Fn**+↑ **(PgUp)** and **Fn** + ↓ **(PgDn)** to move between the two pages.

2. Press either the **Space bar** or **Back Space** to change the value.

### Accepting Changes and Exiting the SETUP Window

1. Press **End** to accept the changes you made.

   If the changed item does not require the system to reboot, the following message is displayed:

   ```
   Are you sure? (Y/N)
   ```

   If the changed item requires the system to reboot, the following message is displayed:

   ```
   Are you sure? (Y/N)
   The changes you made will cause the system to reboot.
   ```

2. To make other changes, press **N**. Repeat the steps above.

3. To accept the changes, press **Y**.

> ***NOTE:*** *You can press* **Esc** *to quit at any time without saving changes. SETUP asks you to confirm that you do not want to save your changes. When SETUP is displayed at the next time, the current configuration appears.*

### The Factory Preset Configuration

When you access SETUP, the current configuration is displayed.

1. To display the factory preset configuration, press **Fn,** ← and **Home**.

2. To accept the default settings, press **End** and then press **Y**.

> ***NOTE:*** *When you execute the default setting, the following settings are not changed:*
> *(1) HDD mode*
> *(2) Password*
> *(3) Write Policy*

## SETUP Options

The SETUP screen is divided into 15 functionally related groups. This section describes each group and its option.

1. Memory

   This group of options displays the computer's memory.

   Total

   This field displays the total amount of memory installed and is automatically calculated by the computer. You cannot change this value.

2. System Date/Time

   Sets the date and time with **Space** and **Backspace** key. Change of Hour to Minute (and vice versa), and of Month to Day (and vice versa) with ↑ and ↓.

   (a) System Date/Time

   Use this option to set the date (month-day-year).

   (b) System Date/Time

   Use this option to set the time (hour : minute).

3. Battery

   This option is used to select Full Power, Low Power or User Setting of the battery save mode. When you select the battery save mode, the followings will appear.

   **Full Power** The following shows full power settings.

```
BATTERY SAVE OPTIONS

Processing Speed        = High
CPU Sleep Mode          = Enabled
Display Auto off        = 30Min.
HDD Auto off            = 30Min.
System Auto off         = Disabled (*1)
LCD Brightness          = Bright (*2)
                          Super-Bright (*3)
Cooling Method          = Maximum Performance
```

   **Low Power** The following shows low power settings.

**BATTERY SAVE OPTIONS**

```
Processing Speed        = Low
CPU Sleep Mode          = Enabled
Display Auto off        = 03Min.
HDD Auto off            = 03Min.
System Auto off         = 30Min. (*1)
LCD Brightness          = Semi-Bright (*2)
                          Bright (*3)
Cooling Method          = Battery Optimized
```

> ***NOTE:*** *In boot mode, the System Auto Off (*1) item does not appear.*
> *Display of the LCD Brightness will be changed in the condition below:*
> *(*2) Operating by the battery*
>
> *(*3) Using the AC adapter*

**User Setting** Use this option to set the battery save parameters on the sub-window, **BATTERY SAVE OPTIONS**. For details, see *Battery Save Options* below.

Battery Save Options

(a) Processing Speed

This feature changes the CPU processing speed.

**High** Makes the CPU processing speed high.

(Default in Full Power Mode)

**Low** Makes CPU processing speed low.

(Default in Low Power Mode)

(b) CPU Sleep Mode

Use this option to enable or disable the CPU sleep function.

**Enabled** Enables sleep mode. (Default)

**Disabled** Disables sleep mode.

(c) Display Auto Off

Use this option to disable or set the duration of the display automatic power off function. This function causes the computer to turn the LCD panel's illumination off if you make no entry (including no operation of a mouse or touch pad) for the set period of time.

**Disabled** Disables display automatic power off.

**xx Min.** Automatically turns off the power to the LCD panel's illumination if the panel is not used for the duration set. The duration xx can be set to 1, 3, 5, 10, 15, 20 or 30 minutes.

(d) HDD Auto Off

Use this option to set the duration of the HDD automatic power off function. This option stops the rotation of the HDD if you do not read or write to the HDD more than the duration set.

| | |
|---|---|
| **xx Min.** | Automatically turns off the power to the hard disk drive if it is not used for the duration set. The duration xx can be set to 1, 3, 5, 10, 15, 20, 30. |

(e) System Auto Off

Use this option to disable or set the duration of the system automatic off function in Resume mode. This option turns off the power to the system at the time set if the computer is not used. In Boot mode, this is disabled.

| | |
|---|---|
| **Disabled** | Disables system automatic power off. |
| **xx Min.** | Automatically turns off the power to the system if it is not used for the duration set. The duration xx can be set to 10, 20, 30, 40, 50 or 60 minutes or Disabled. |

(f) LCD Brightness

Use this option to set the level of LCD brightness.

| | |
|---|---|
| **Super-Bright** | Full brightness for maximum visibility. |
| **Bright** | Full brightness for high visibility. |
| **Semi-Bright** | Less than full brightness for saving power. |

(g) Cooling Method

| | |
|---|---|
| **Maximum Performance** | If the CPU becomes too hot, the fan turns on automatically in a high speed to cool down the CPU. |
| **Performance** | If the CPU becomes too hot, the fan turns on automatically. When the CPU temperature falls to a normal range, the fan turns off. |
| **Battery optimized** | If the CPU becomes too hot, the processing speed is lowered. If the temperature is still too high, the fan turns on. When the CPU temperature falls to a normal range, the fan is turned off and the processing speed is increased. |

> ***NOTE**: Too hot condition may cause defect on the CPU. When the hot condition continues, the power is automatically turned off in resume mode.*

4. Password

   This option sets or resets the user password for power on and instant security (**Fn+F1**).

   | | |
   |---|---|
   | **Registered** | The user password has been registered. |
   | **Not registered** | The user password has not been registered. |

   For details on setting the user password, refer to the User's Manual.

5. HDD password

   This option allows you to register or delete HDD password.

   (a) HDD

   Hard disk for setting the password.

   | | |
   |---|---|
   | **Built-in HDD** | The password is set to Built-in HDD. This option can not be changed. |

   (b) HDD Password Mode

   Select the HDD password to be registered. This can be selected only when a user HDD password or master password is not registered. When a user HDD password or master password is registered, once delete it and select the mode.

   | | |
   |---|---|
   | **User Only** | Sets a User HDD Password only. (Default) |
   | **Master+User** | Sets a Master HDD Password and User HDD Password. |

   (c) User Password

   Sets a User HDD Password.

   For detailed information on the HDD password, refer to User's Manual.

6. Boot Priority

   (a) Boot Priority

   Use this option to set the priority for booting of the computer and the priority for the HDD for booting.

   | | |
   |---|---|
   | **HDD→FDD→ CD-ROM→LAN:** | The computer looks for bootable files in the following order: HDD, FDD, CD-ROM and LAN. (Default) |
   | **FDD→HDD→CD-ROM→LAN:** | The computer looks for bootable files in the following order: FDD, HDD, CD-ROM and LAN |

**HDD→ CD-ROM→LAN→FDD:** The computer looks for bootable files in the following order: HDD, CD-ROM, LAN and FDD.

**FDD→ CD-ROM→LAN→HDD:** The computer looks for bootable files in the following order: FDD, CD-ROM, LAN and HDD.

**CD-ROM→LAN→HDD→FDD:** The computer looks for bootable files in the following order: CD-ROM, LAN, HDD and FDD.

**CD-ROM→LAN→FDD→HDD:** The computer looks for bootable files in the following order: CD-ROM, LAN, FDD and HDD.

(b) HDD Priority

Use this option to select the priority when using HDDs.

**Built-in HDD→PC card** Search a booting file in the order of built-in HDD in PC and PC card type HDD.

**PC card → Built-in HDD** Search a booting file in the order of PC card type HDD and built-in HDD in PC.

(c) Network Boot Protocol

Use this option to set the starting method via a network.

**PXE** Sets to PXE protocol. (Default)

**RPL** Sets to RPL protocol.

7. Display

This group of options configures the computer's display.

(d) Power On Display

This option is used to select the display when booting up.

**Auto-Selected** Selects an external monitor if one is connected. Otherwise, it selects the internal LCD. (Default)

**LCD+AnalogRGB** Selects both the internal LCD and the external CRT for simultaneous display.

> ***NOTE:*** *When Simultaneous is selected while connecting the external display not corresponding to SVGA mode, no image appears on the display.*

8. Others

Whether or not you need to configure the computer with these options depends primarily on the kind of software or peripherals you use.

(a) CPU Cache

Use this option to enable or disable the CPU cache.

**Enabled** Enables the CPU cache. (Default)

**Disabled** Disables the CPU cache.

When "Enabled" is selected, the following sub-window is displayed to select the cache write policy. The options for this setting are **Write-back** (default) and **Write-through** for CPU cache.

```
             OPTION
Write policy      =  Write-back
```

Write-back policy provides better system performance, because main memory is accessed only when necessary to update the cache contents with changes in main memory. Write-through policy accesses main memory every time data is handled by the processor.

(c) Level 2 Cache

Use this option to enable or disable the level 2 cache. When "CPU Cache" is set to "Disabled", this option cannot be changed.

**Enabled** Enables the level 2 cache. (Default)

**Disabled** Disables the level 2 cache.

(d) Dynamic CPU Frequency mode

Use this option to choose a setting from the followings.
This is displayed only when the CPU is a Mobile Intel® Pentium® III processor-M.

**Dynamically Switchable**

Enables Intel SpeedStep technology. When the computer is in use, CPU power consumption and clock speed are automatically switched when necessary. (Default)

**Always High** Disables Intel SpeedStep technology and always runs the processor at its fastest speed.

**Always Low** Disables Intel SpeedStep technology and always runs the processor at low power consumption and low speed

(e) Auto Power On

This option displays setting for Wake-up on LAN.

**Disabled** Indicates auto power on and Wake-up on LAN is not set.

**Enabled** Indicates auto power on and Wake-up on LAN is set.

When "Enabled" is set, the following sub-window appears.

Auto power on and Wake-up on LAN is set in the options sub-window. To set alarm time, use **Space** and **BackSpace**. To switch between time and minute, month and date, use ↑ and ↓.

```
                OPTIONS
 Alarm Time             = 00:00:00
 Alarm Date Option      = Disabled
 Wake-up on LAN         = Disabled
```

Alarm Time sets a time and date for automatic power on. Second cannot be set. When this option is set to "Disabled", the time for automatic power on is not set.

Alarm Date Option sets a month and date in order for automatic power on. When Alarm Time is set to "Disabled", month and date for automatic power on is not set.

Wake-up on LAN automatically turn on the computer when accessed by the administrator of LAN. When Built-in LAN is "Enabled", this option can be set to "Enabled". AC adapter is required for this option.

***NOTE:*** *1. Do not remove the AC adapter and battery pack at the same time when you use this feature. If you do so, data saved by the resume function will be lost. You must also reset this option.*

*2. If you have set a password and the computer boots by the Auto Power On function and Resume is on, the computer will start with the instant security function enabled. The* ***password =*** *message is not displayed; however, you must enter the password to use the computer.*

*3. This option is enabled only once, the setting is reset, after booting up*

9. Configuration

   This option lets you set the device configuration.

   | | |
   |---|---|
   | **Setup by OS** | Operating system sets devices that it can control. (Default) |
   | **All Devices** | BIOS sets all devices. |

> ***NOTE:*** *When using installed OS, selecting "Set by OS" is recommended. But, when setting "PC CARD-Controller Mode" to other than " Auto-Selected", select " All Devices".*

10. DRIVES I/O

    This option set the HDD, CD-ROM and PC card.

    (a) Build-in HDD

    Displays an address and interrupt level for the hard disk drive.

    (b) PC Card

    Displays an address and interrupt level for a PC card type of hard disk drive that can boot the computer, when the computer is booted by the drive.

11. PCI Bus

    This option displays the interrupt level for the Card Bus in the computer. It is for information only and cannot be changed.

```
PCI BUS    = IRQ11
```

12. PC Card

    This option displays the PC Card Controller mode. When "Device Config." is set to "All Devices", it can be changed.

    | | |
    |---|---|
    | **Auto-Selected** | Use this setting when OS supports Plug&Play. (Default) |
    | **Card Bus/16 bit** | Use this setting when Cared Bus does not work properly in "Auto-Selected" or PC card supports 16-bit. |
    | **PCIC** | Use this setting when using a 16-bit PC card which does not operate correctly in Auto-Selected or CardBus/16-bit. |

13. Peripheral

This option set the HDD and other devices.

(a) Internal Pointing Device

| | |
|---|---|
| **Enabled** | Enables touch pad. (Default) |
| **Disabled** | Disables touch pad. |

(b) Hard Disk Mode

Use this item to select the hard disk mode.

**Enhanced IDE (Normal):**

Select this mode when the HDD is used for Windows XP Tablet PC Edition. (Default)

**Standard IDE :**

Select this mode when using an OS which does not support the Enhanced IDE. When this mode is selected, up to 528MB is logically available and the rest of the capacity is not usable.

> ***NOTE****: Formats for Enhanced IDE and Standard IDE are different, so if you change the setting, you will have to reformat the hard disk for the appropriate setting.*

14. LEGACY EMULATION

(a) USB KB/Mouse Legacy Emulation

This option sets the Legacy support condition of the USB keyboard and the USB mouse.

| | |
|---|---|
| **Enabled** | Enables LEGACY support. (Default)<br>USB keyboard/USB mouse are available without the driver. |
| **Disabled** | Disables LEGACY support |

(b) USB-FDD Legacy Emulation

This option sets the Legacy support condition of the USB floppy disk drive.

| | |
|---|---|
| **Enabled** | Enables LEGACY support. (Default)<br>USB floppy disk is available without the driver. To start the computer by FD, set this option to "Enabled".<br>Even when “USB-FDD Legacy Emulation” is set to “Enabled and when “Boot Priority” of “Boot PRIORITY” |

is set to “FDD→FDD→CD-ROM→LAN”, the PC boots by the built-in HDD.

**Disabled** Disables LEGACY support

15. PCI LAN

This option sets the Enable / Disable of the built-in LAN functions.

**Enabled** Enables built-in LAN functions. (Default)

**Disabled** Disables built-in LAN functions.

# Chapter 4

# Replacement Procedures

# Chapter 4 Contents

## Figures

# 4.1 Overview

This chapter describes the procedure for removing and replacing the field replaceable units (FRUs) in the PC. It may not be necessary to remove all the FRUs in order to replace one. The chart below provides a guide as to which other FRUs must be removed before a particular FRU can be removed. The numbers in the chart indicate the relevant section numbers in this manual.

In all cases when removing an FRU, the battery pack must also be removed. When repairing an FRU that is the potential cause of a computer fault, use the chart to determine the order in which FRUs need to be removed.

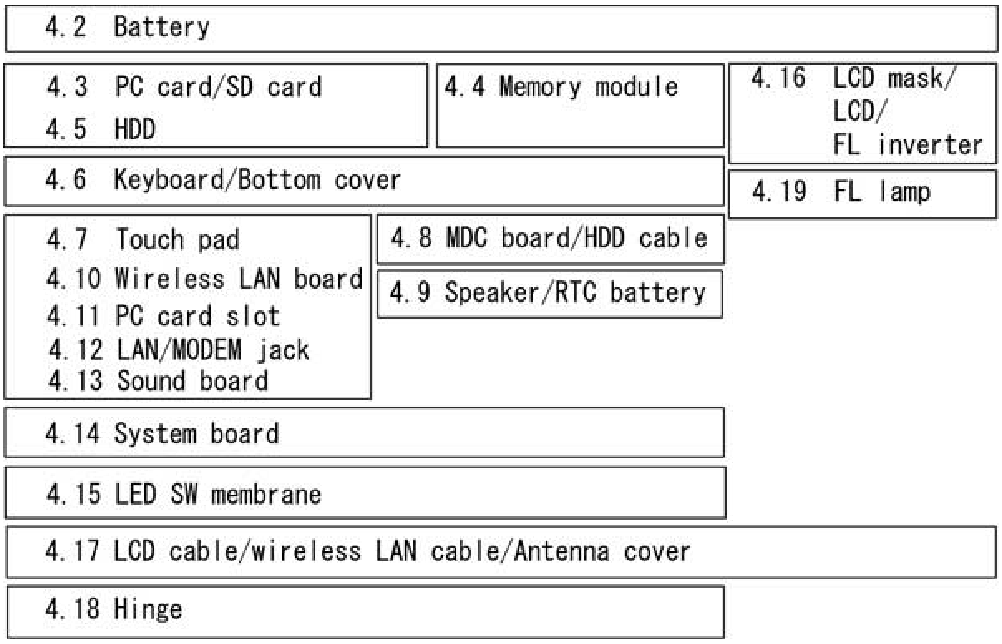
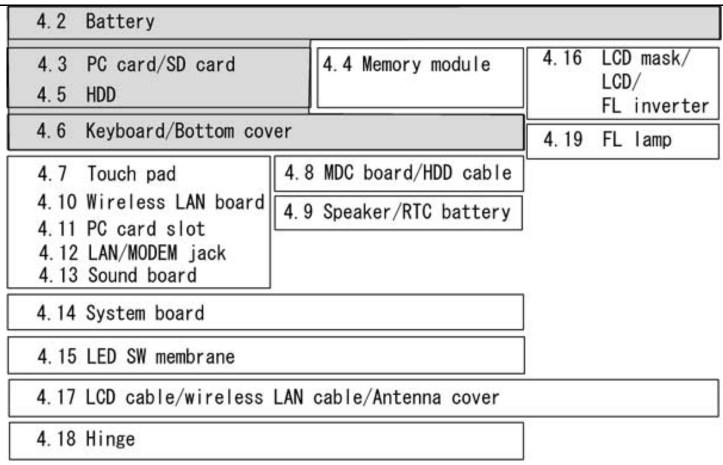



Chart Notation:

The chart to the right shows the case for the following example:

- **Removing the touch pad**.

All FRUs
(from 4.2 Battery to
4.6 Keyboard/Bottom) must be removed.



## Safety Precautions

Please read the following safety instructions before disassembling the computer and always follow the instructions while working on the computer.

***Danger:*** *1. In the case of the battery, always use authentic parts or equivalent parts approved by Toshiba. Other batteries may have different specifications that are incompatible with the computer and may result in fire or explosion.*
*Due to the risk of alkali fluid leaks, never attempt to heat or disassemble the battery. Similarly, due to the risk of explosion, never expose the battery to flame.*

*2. Some parts including the power supply and FL inverter generate high voltages. If you need to turn on the power while disassembling the computer, do not touch any connectors or other components due to the risk of electric shock. Also, do not disassemble individual parts when performing routine maintenance.*

***Warning:****1. To prevent electric shock, turn off the power unplug the AC adapter from the power source.*

*2. As the battery installed to the computer is typically already charged, the risk of electric shock remains even when the AC adapter is unplugged from the socket. To prevent electric shock, always take off any metal jewelry or accessories such as necklaces, bracelets or rings before working on the computer. Never work with wet or moist hands.*

*3. Take care not to injury yourself on any edges or corners.*

*Caution: 1. Confirm that replacement parts have compatible specifications before replacing on the computer. Never use incorrect parts as these may cause faults on the computer.*

*2. To prevent internal damage such as short circuits or burning, do not allow any screws, paper clips, or other metal objects to fall into the computer. When removing screws, always replace with the same size screw. Ensure that all screws are fully tightened. Loose screws may result in short circuits leading to overheating, smoke or flame.*

*3. To prevent electric shock, check that you have disconnected all cables from a part before removing the part.*

*4. When connecting to the AC power supply, use only an AC adapter and cable approved by Toshiba.*

*5. To prevent electric shock, ensure that all replacement parts are compatible with the computer and that all cables and connectors are securely connected.*

## Before You Begin

Take note of the following points before starting work. Always remove the AC adapter and battery pack before commencing any of the procedures. The procedure for removing the battery pack is described in section “4.2.1 Battery Pack”.

1. Do not disassemble the computer unless it is operating abnormally.

2. Use the designated tools.

3. Ensure that the environment for working on and storing parts does not contain any of the following.

   - ❑ Dust or dirt
   - ❑ Static electricity
   - ❑ Extremely hot, cold, or humid conditions

4. Perform the diagnostic tests described in Chapter 2 to determine which FRU is the cause of the fault.

5. Do not perform any unnecessary work. Always work in accordance with the disassembly and re-assembly procedures in this manual.

6. Keep parts removed from the computer in a safe place away from the computer where they will not be damaged or interfere with your work.

7. Disassembling requires the removal of a large number of screws. Keep removed screws in a safe place such that you can determine which screws belong to which part.

8. When reassembling, ensure that you use the correct screws and fit parts in the correct position. Screw sizes are noted in the text and figures.

9. As all parts have sharp edges and corners, take care not to cut yourself.

10. After replacing an FRU, check that the computer and replaced part operate correctly.

## Disassembly Procedures

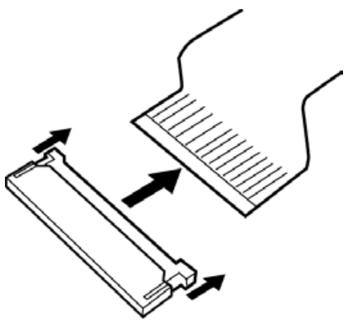
Three main types of cable connector are used.

- ❑ Pressure plate connector
- ❑ Spring connector
- ❑ Normal pin connector

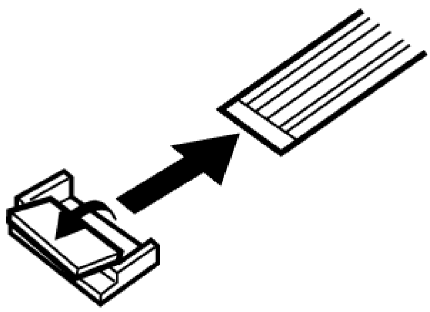
1. When disconnecting a pressure plate connector, draw the tab on one side of the plastic pressure plate on the connector and pull the cable out from the connector. When reconnecting a cable to a pressure plate connector, draw enough the pressure plate and insert the cable into the connector. Press both sides of the pressure plate such that both sides of the plate and connector are at the same height and that the cable is fixed in the correct position. Pull the cable to ensure that it is securely connected. If the cable is disconnected from the connector, reconnect it making sure that you draw enough the pressure plate to insert fully the cable.

2. For spring connectors, lifting up the stopper frees the cable and allows it to be pulled out. To reconnect, hold the stopper in the up position and insert the cable, then lower the stopper to secure the cable.

3. Normal pin connectors are used for all other cables. Simply pull out or push in these connectors to disconnect or reconnect.



Pressure plate connector



Spring connector

### Assembly Procedure

After the computer has been disassembled and the part that caused the fault has been repaired or replaced, the computer must be reassembled.

Take note of the following general points when assembling the computer.

- ❑ Take your time and follow the instructions carefully. Hurrying the assembly work will only introduce new problems.
- ❑ Check that all cables and connectors are securely connected.
- ❑ Before fastening FRUs or other parts in place, ensure that no cables are caught on screws or the FRU.
- ❑ Check that all latches are securely closed.
- ❑ Ensure that you have installed all FRUs correctly and do not have any screws left over. Using an incorrect screw may damage the thread or screw head and result in the FRU not being securely fastened in place.

After installing FRUs, check that the computer operates correctly.

### Tools and Equipment

For your safety and the safety of the people around you, it is important that you use Electrostatic Discharge (ESD) equipment. Correctly utilizing of the equipment increases the percentage of successful repairs and saves on the cost of damaged or destroyed parts. The following equipment is required for disassembly and assembly.

- ❑ One Philips screwdriver with type 0 bit (for THIN HEAD screws)
- ❑ One Philips screwdriver with type 1 bit (for screws other than above)
- ❑ One screwdriver for LH sticks (for Mini PCI card cover)
- ❑ Tweezers (for lifting screws)
- ❑ ESD mats (lay on work table or floor)
- ❑ An ESD wrist strap and heel grounder
- ❑ Anti-static carpet or flooring
- ❑ A pair of needle-nose pliers

### Screw Tightening Torque

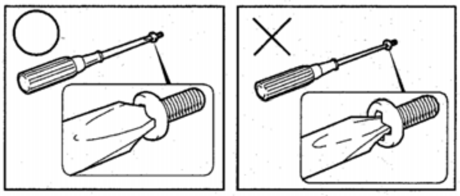
Use the following torque when tightening screws.

> ***Caution**: Overtightening may damage screws or parts. Undertightening may allow screws to loosen (and possibly fall out) causing a short circuit or other damage.*

> ***Note**: To tighten screws quickly and accurately, an electric screwdriver is recommended.*

- ❑ M2 (2mm) 0.167 N·m (1.7 kgf·cm)
- ❑ M2.5 (2.5mm) 0.294 N·m(3.0 kgf·cm)
- ❑ M3 (3mm) 0.549 N·m(5.6 kgf·cm)

> ***Note:** To prevent damage to THIN HEAD screws, press along the axis of the screwdriver while turning the screw. This is because the contact area between the screw and driver is less than for a pan head screw (standard pan-shaped screw head).*



### Grip Color

Some screws have a colored grip area to help you determine the length of the screw.

- ❑ Even numbered length screws: Brown
- ❑ Odd numbered length screws: White
- ❑ Special length screw: Blue



Grip area

“Special length screw” means screws whose length is indicated in an integral number to the first decimal places such as 2.5 mm, 2.8 mm and so on.

## Screw Notation

To make maintenance of the computer easier, markings of the kinds of the screws including the types and lengths of the screws are indicated on the computer body.

Format:

Screw shape + Screw length (mm)

Screw shape

B: Bind screw
F: Flat head screw
S: Super thin head screw
T: Tapping screw
U: Other screws (Unique screws: pan head, stud, etc.)

Example: B6 ... 6mm bind screw

# 4.2 Battery pack

### Removing the battery pack

The following describes the procedure for removing the battery pack (See Figurer 4-1)

> ***Caution:*** *Take care not to short circuit the terminals when removing the battery pack. Similarly, do not drop, knock, scratch, disassemble, twist, or bend the battery pack.*

1. Turn off the power of the computer.
2. Disconnect the AC adapter and all other external devices from the computer.
3. Turn the computer upside down.
4. Slide the battery latch in the direction indicated by the arrow and open the lock. Pull the battery slightly.

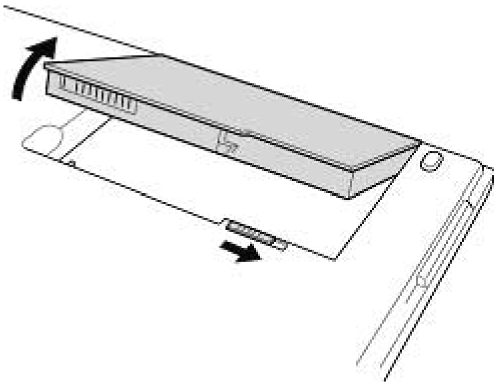


*Figure 4-1 Removing the battery pack*

> ***Note**: Dispose of the used battery pack in accordance with the laws and ordinances of your local authority.*

### Installing the battery pack

The following describes the procedure for installing the battery pack. (See Figure 4-1)

> ***Caution:*** *There is a danger that the lithium ion battery pack may explode if not fitted, operated, handled, or disposed correctly. Dispose always the used battery pack in accordance with the laws and ordinances of your local authority. Use only the batteries approved by Toshiba.*

> ***Note:*** *Check visually the battery terminals and clean off any dirt with a dry cloth.*

1. Turn off the power of the computer.
2. Connect the AC adapter and all other external devices to the computer.
3. Inset the battery fitting the guides.

# 4.3 PC card/SD memory card

## 4.3.1 PC card

### Removing the PC card

The following describes the procedure for removing the PC card. (See Figure 4-2)

> ***Caution:*** *Insert or remove the PC card in accordance with any instructions in the PC card manual or the manuals of the computer system you are using.*

1. Push the eject button. It will pop out when you release it. Then press the eject button again to eject the PC card.
2. Grasp the PC card and remove it.

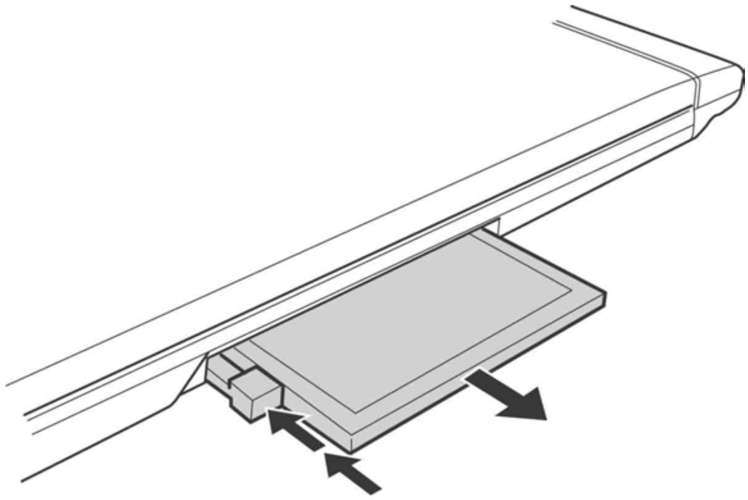


*Figure 4-2 Removing the PC card*

### Installing the PC card

The following describes the procedure for installing the PC card. (See Figure 4-2)

1. Make sure the eject button does not stick out.
2. Insert the PC card and press it until it is securely connected.

### 4.3.2 SD memory card

#### Removing the SD memory card

The following describes the procedure for removing the SD memory card. (See Figure 4-3)

> ***Caution:*** *Insert or remove the SD memory card in accordance with any instructions in the SD memory card manual or the manuals of the computer system you are using.*

1. Push the SD memory card. It will pop out partly when you release, then pull out the card.

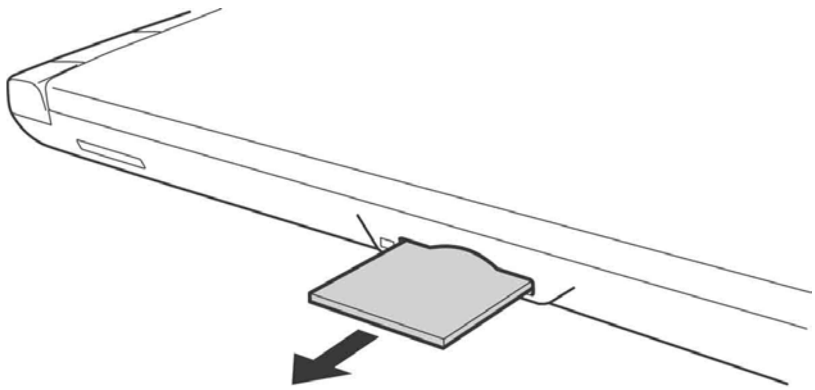


*Figure 4-3 Removing the SD Memory card*

#### Installing the SD memory card

The following procedure describes the procedure for installing a SD memory card. (See Figure 4-3.)

1. Insert the SD memory card and press it until it securely connected.

# 4.4 Memory module

> ***Caution:*** *The power of the computer must be turned off when you remove the memory module. Removing a memory module with the power on risks damaging the module or the computer itself.*
>
> *Do not touch the memory module terminals. Any dirt on the terminals may cause memory access problems.*
>
> *Never press hard or bend the memory module.*

## Removing the memory module

To remove a memory module, confirm that the computer is in boot mode. Then perform the following procedure (See Figures 4-4, 4-5)

1. Turn the computer upside down.

2. Remove the following screws fixing the memory slot cover.

   - M2×2.5B SPECIAL HEAD screw x1

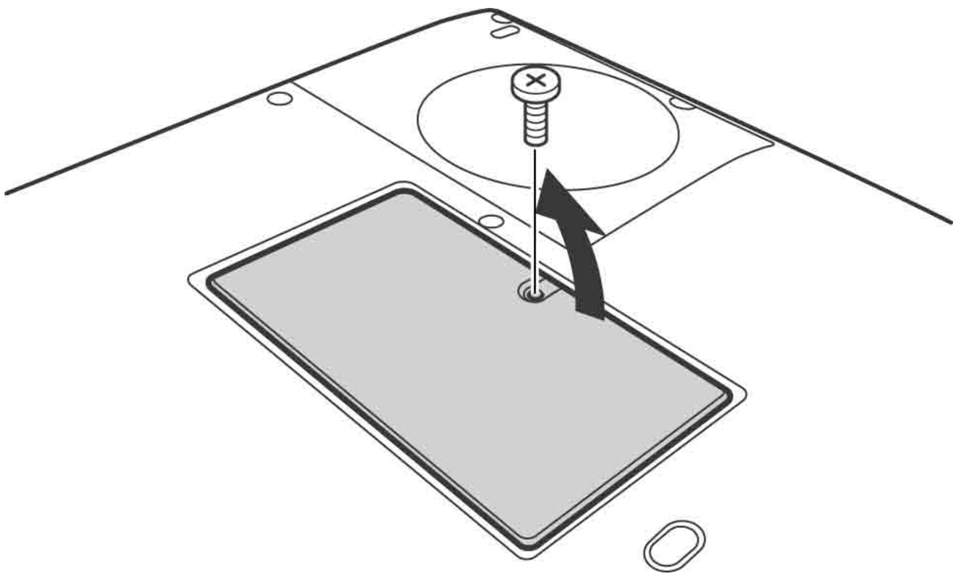


*Figure 4-4 Removing the memory slot cover*

3. Remove the memory slot cover.

4. Push both the latches to the outside and remove the memory module.

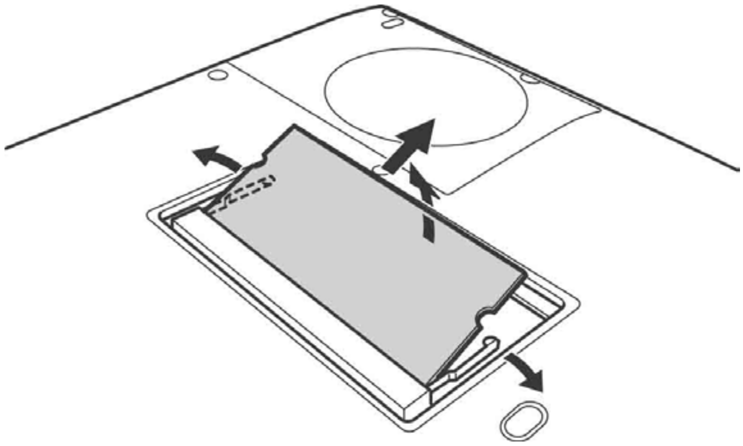


*Figure 4-5 Removing the memory module*

### Installing the memory module

To install the memory module, confirm that the computer is in boot mode. Then perform the following procedure (See Figures 4-4, 4-5)

1. Connect the memory module to the connector on the system board and push it downward.

> ***Caution:*** *The power must be turned off when you insert the memory module. Inserting a memory module with the power on risks damaging the module or the computer itself.*
>
> *Never press hard or bend the memory module.*

2. Install the memory slot cover.

3. Secure the following screws to fix the memory slot cover.

   - M2×2.5B SPECIAL HEAD screw x1

# 4.5 HDD

## Removing the HDD

The following describes the procedure for removing the HDD (See Figures 4-6, 4-7, 4-8)

> ***Caution:*** *Take care not to press on the top or bottom of the HDD. Pressure may cause data loss or damage to the device.*

1. Turn the computer upside down.
2. Remove the following screws fixing the HDD slot cover and remove the cover.

   - M2×4B BIND screw x2

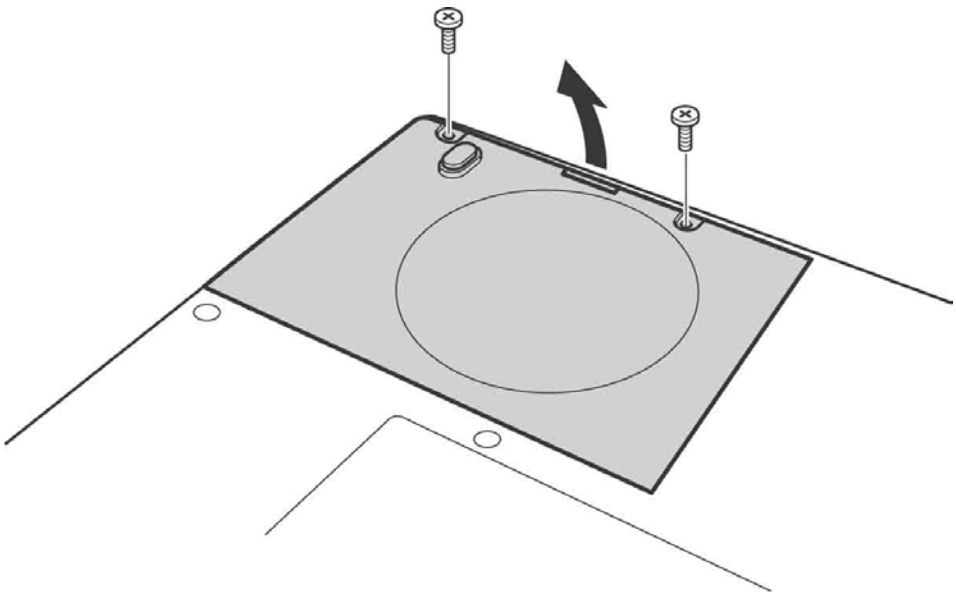


*Figure 4-6 Removing the HDD slot cover*

3. Hold the HDD holder handle and remove the HDD ASSY from the connector of the system board

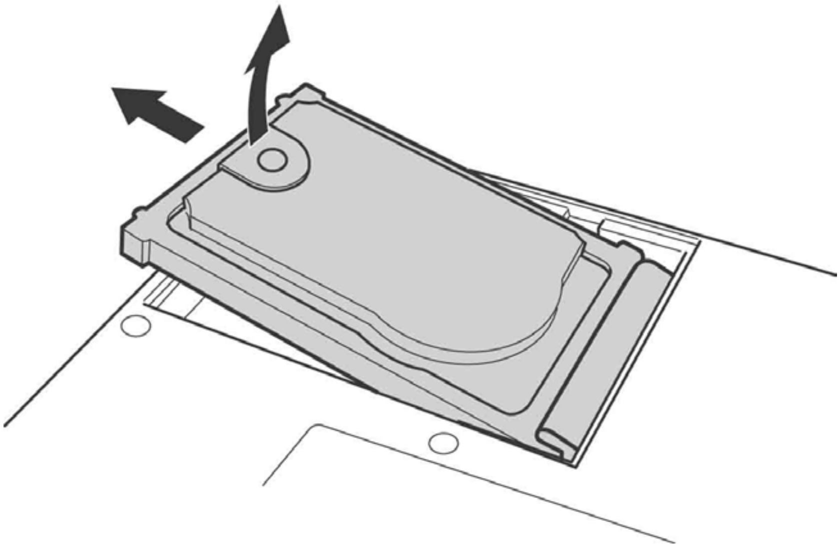


*Figure 4-7 Removing the HDD ASSY*

4. Detach the HDD holder from the HDD.

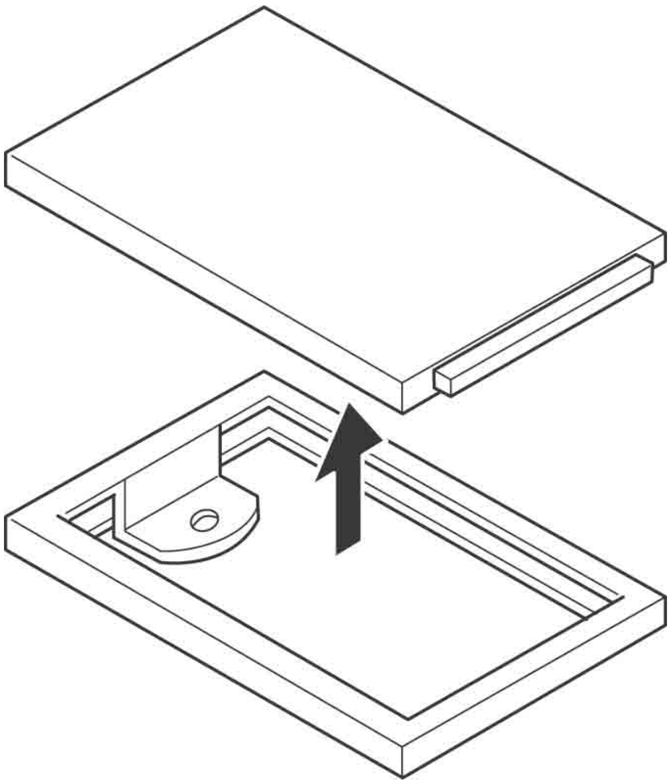


*Figure 4-8 Removing the HDD*

### Installing the HDD

The following describes the procedure for installing an HDD (See Figures 4-6, 4-7, 4-8).

1. Install the HDD to the HDD holder.

2. Insert the HDD into the connector of the system board while holding the HDD holder handle, then set the HDD ASSY.

3. Install the HDD slot cover and secure it with the following screws.

   - M2×4B BIND screw x2

# 4.6 Keyboard/Bottom cover

## 4.6.1 Keyboard

### Removing the keyboard

The following describes the procedure for removing the keyboard (See Figures 4-9, 4-10).

> ***Caution:*** *The keytop may fall out; when handling the keyboard always hold it by the frame and do not touch the keytop.*

1. Remove the following screw securing the bottom cover.

    - M2×4B BIND screw x1

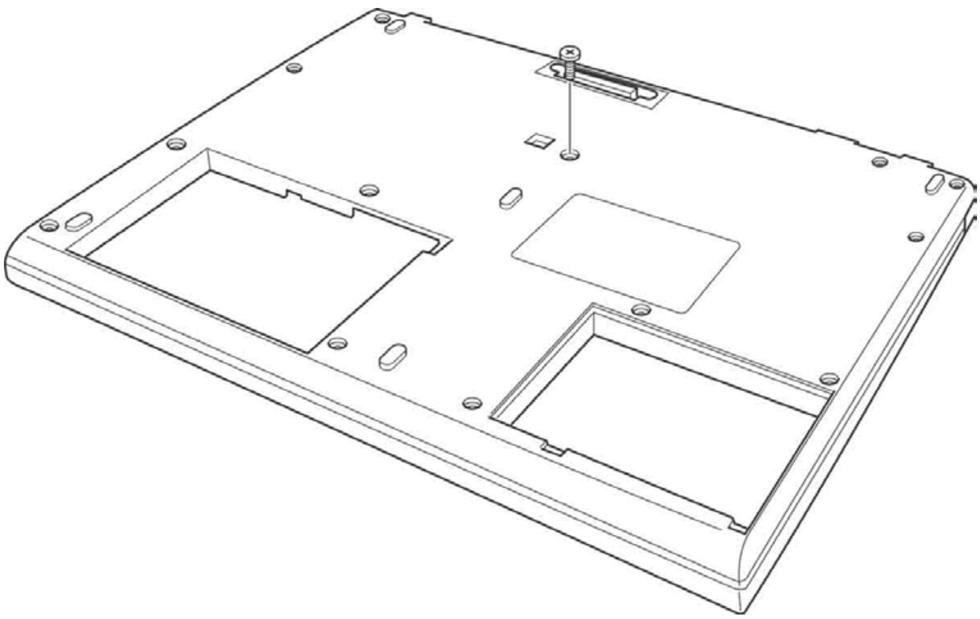


*Figure 4-9 Removing the bottom cover*

2. Open the display.

3. Insert your nails in the slot on the right and left of the keyboard holder and lift it up to remove.

4. Remove the following screws securing the keyboard.

- M2×3B S-THIN HEAD screw x2

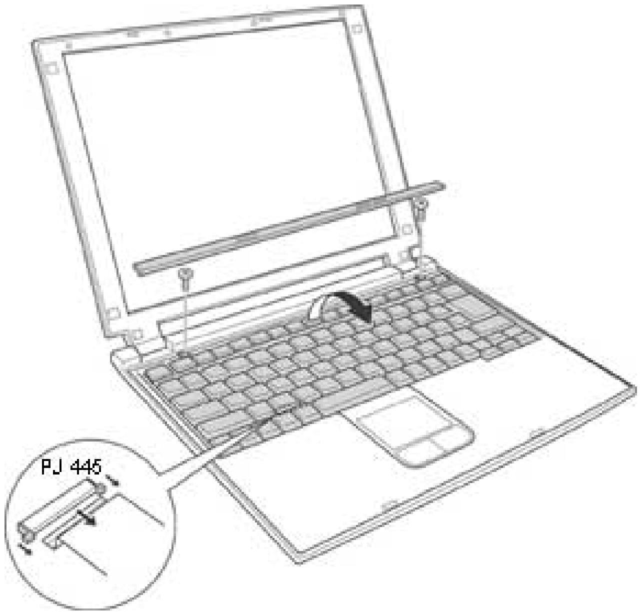



*Figure 4-10 Removing the keyboard holder*

5. Pick up the top of the keyboard from the front and disconnect the flexible keyboard cable from PJ445 on the system board.

### Installing the keyboard

The following describes the procedure for installing the keyboard (See Figures 4-9, 4-10).

1. Connect the flexible keyboard cable to PJ445 on the system board.

2. Install the keyboard and secure it with the following screws.

- M2×3B S-THIN HEAD screw x2

3. Install the keyboard holder.

4. Close the display

5. Install the bottom cover and secure it with the following screw.

- M2×4B BIND screw x1

## 4.6.2 Bottom cover

### Removing the bottom cover

The following describes the procedure for removing the bottom cover. (See Figures 4-11, 4-12)

1. Remove the following screws.

   - M2×4Z S-THIN HEAD screw x3

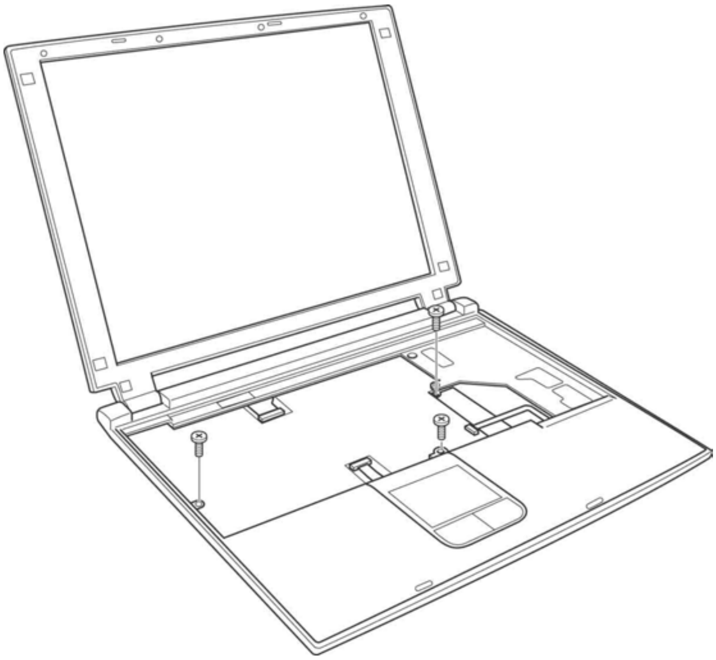


*Figure 4-11 Removing the bottom cover(1)*

2. Turn over the computer and remove the following screws.

| | | |
|---|---|---|
| • M2×6B | BIND screw | x11 |
| • M2×6B | FLAT BIND screw | x1 |
| • M2×4B | BIND screw | x2 |

([1],[2],[3],[4]: Order of driving screws in assembling.
No specific order for other screws.)

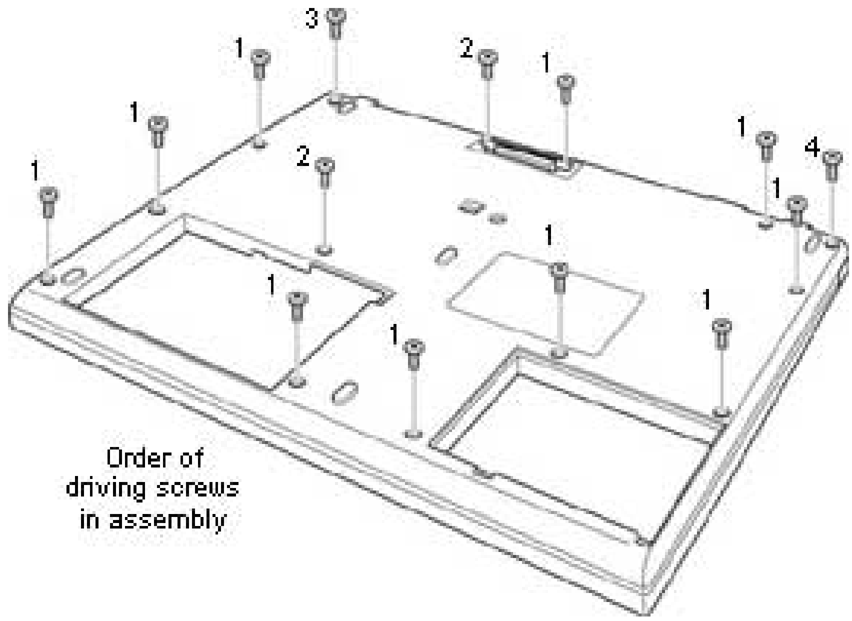



*Figure 4-12 Removing the bottom cover(2)*

3. Remove the bottom cover.

### Installing the bottom cover

The following describes the procedure for installing the bottom cover. (See Figures 4-11, 4-12)

1. Turn over the computer and install the bottom cover from the IO connector side first.

2. Secure the following screws.

   - M2×6B BIND screw x11
   - M2×6B FLAT BIND screw x1
   - M2×4B BIND screw x2

3. Turn the computer face it up and secure the following screws.

   - M2×4S S-THIN HEAD screw x3

# 4.7 Touch pad

## Removing the Touch pad

The following describes the procedure for removing the touch pad. (See Figure 4-13.)

1. Disconnect the cable from the connector PJ334 on the system board.
2. Release the latches and remove the touch pad holder.
3. Remove the following screws and remove the touch pad.

- M2×2.5BS Special HEAD screw x3

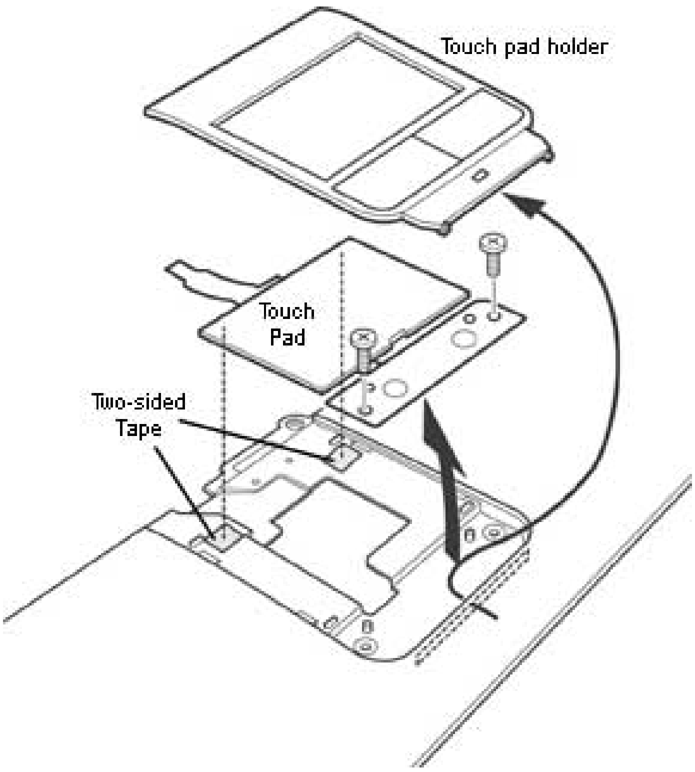



*Figure 4-13 Removing the touch pad*

## Installing a touch pad

The following describes the procedure for installing a touch pad. (See Figure 4-13.)

1. Apply the touch pad fitting to the guide.
2. Secure the touch pad with the following screws.
   - M2×2.5BS Special HEAD screw x3
3. Install the touch pad holder.
4. Connect the cable to the connector PJ334 on the system board.

# 4.8 MDC board/HDD cable

## 4.8.1 MDC board

### Removing the MDC board

The following describes the procedure for removing the MDC board. (See Figure 4-14.)

1. Peel off the glass tape. (See Figure 4-12.)
2. Remove the following screws securing the MDC board.
   - M2×4Z FLAT BIND screw x2
3. Disconnect the MDC cable from the MDC board.

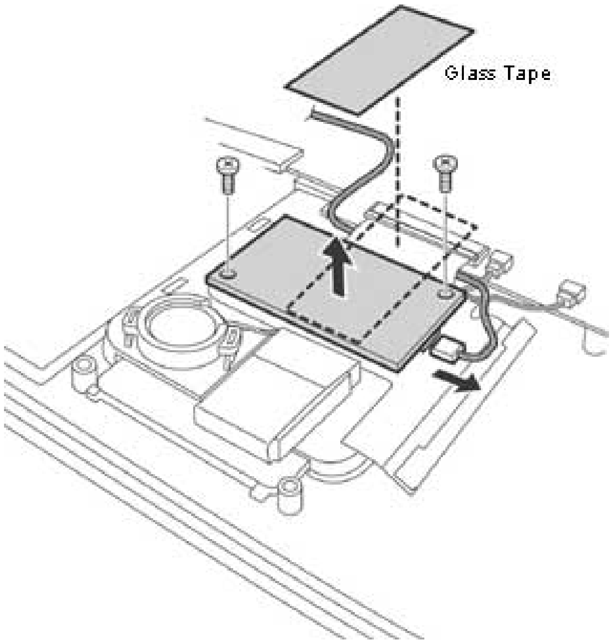



*Figure 4-14 Removing the MDC board*

### Installing the MDC board

The following describes the procedure for installing the MDC board. (See Figure 4-14)

1. Connect the MDC cable to the MDC board.
2. Install the MDC board and secure it with the following screws.
   - M2×4Z FLAT BIND screw x2
3. Apply the glass tape to secure the MDC cable.

### 4.8.2 HDD cable

#### Removing the HDD cable

The following describes the procedure for removing the HDD cable. (See Figure 4-15)

1. Remove the HDD cable from the connector PJ3 on the system board.

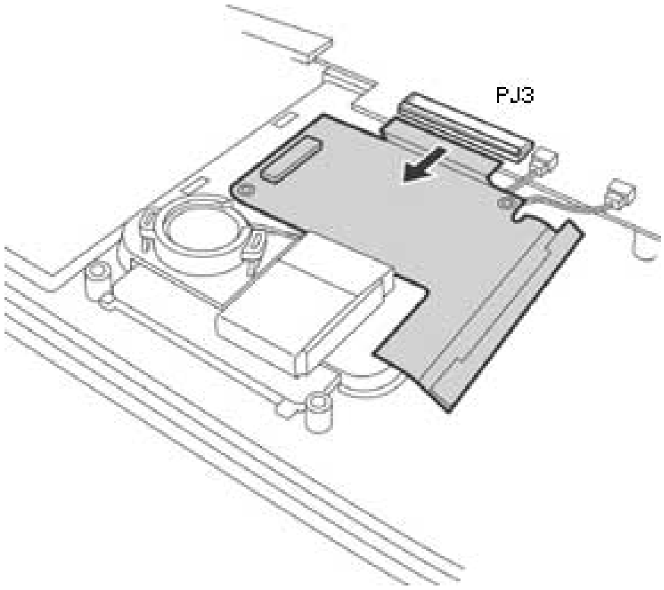



*Figure 4-15 Removing the HDD cable*

#### Installing the HDD cable

The following describes the procedure for installing the HDD cable. (See Figure 4-15)

1. Connect the connector PJ3 to the system board and install the HDD cable.

# 4.9 Speaker/ RTC battery

## 4.9.1 Speaker

### Removing the speaker

The following describes the procedure for removing the speaker (See Figures 4-16, 4-17).

1. Peel off the glass tape.

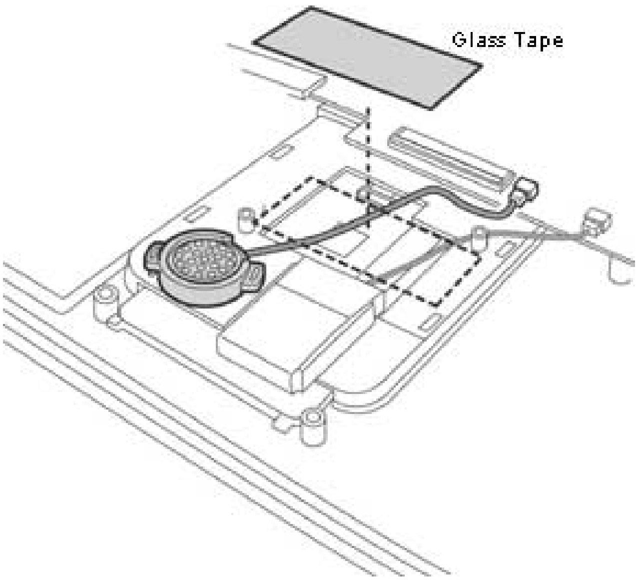



*Figure 4-16 Peeling off the glass tape*

2. Remove the speaker cable from connector PJ6002 on the system board and remove the speaker rubber holder from the speaker slot.

3. Remove the speaker from the rubber holder.

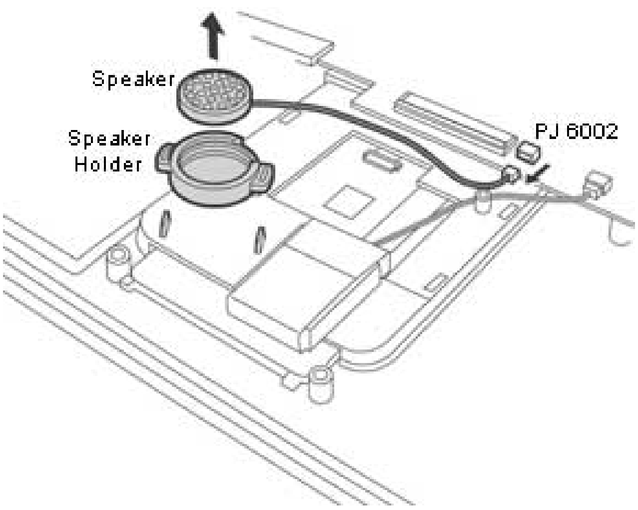



*Figure 4-17 Removing the speaker*

## Installing the speaker

The following describes the procedure for installing the speaker (See Figures 4-16, 4-17).

1. Set the speaker in the rubber holder.

2. Install the speaker rubber holder to the speaker slot and connect the speaker cable to PJ6002 on the system board.

## 4.9.2 RTC battery

### Removing the RTC battery

The following describes the procedure for removing the RTC battery. (See Figure 4-18)

1. Disconnect the RTC battery cable from PJ8760 on the system board and remove the RTC battery from the RTC battery slot.

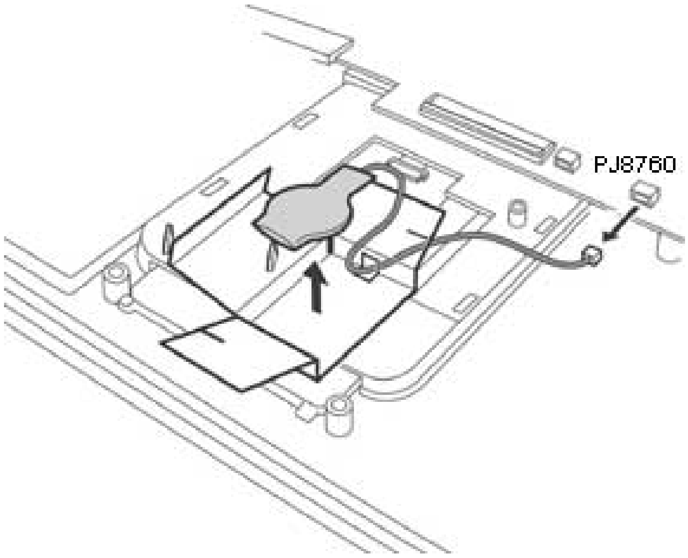



*Figure 4-18 Removing the RTC battery*

### Installing the RTC battery

The following describes the procedure for installing the RTC battery (See Figure 4-18).

1. Install the RTC battery passing through the hole of the RTC battery slot. Connect the RTC battery cable PJ8760 on the system board.

2. Apply the glass tape.

# 4.10 Wireless LAN board

## Removing the wireless LAN board

The following describes the procedure for removing the wireless LAN board. (See Figures 4-19, 4-20, 4-21)

1. Remove the following screws.

- M2×4Z FLAT BIND screw x2 or x1
- TORX screw 0 or x1

(When a specified Wireless LAN board is used, a TORX screw is used.)

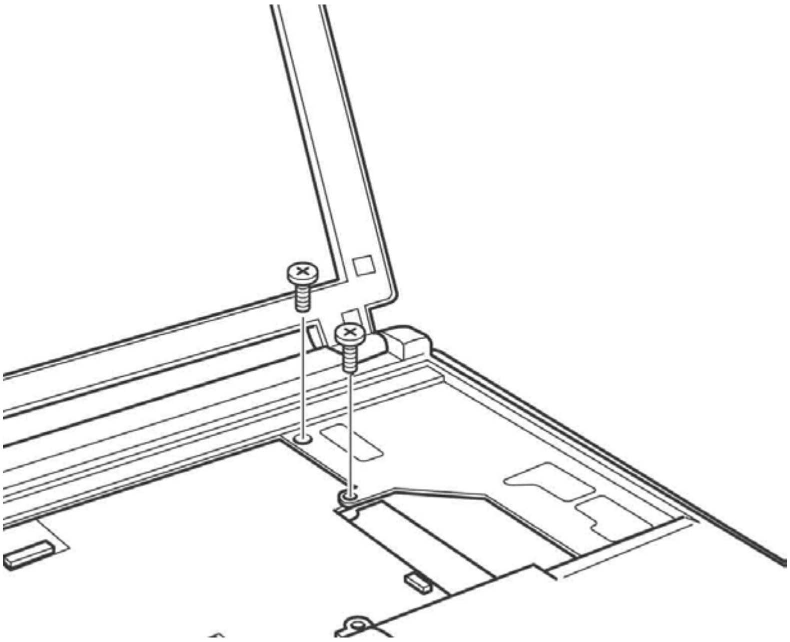


*Figure 4-19 Removing the wireless LAN board(1)*

2. Turn over the computer.

3. Remove the wireless board upward from PJ100 on the system board and peel off the glass tape.

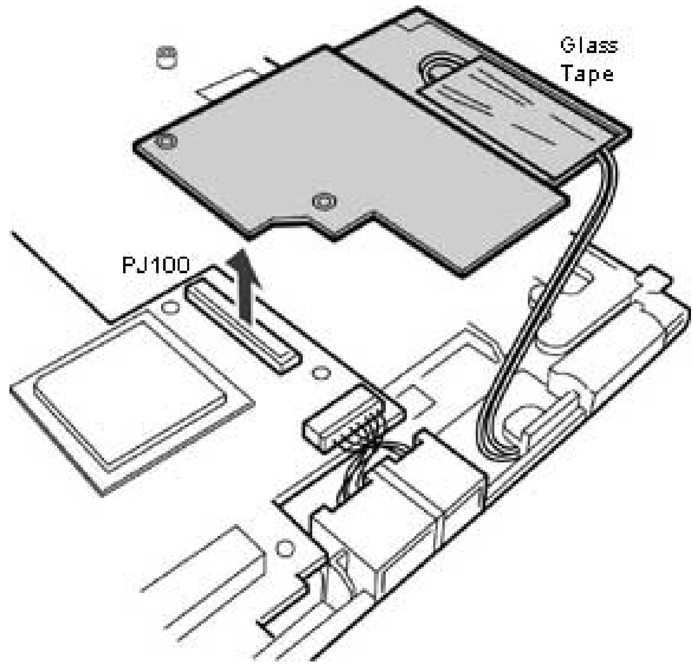



*Figure 4-20 Removing the wireless LAN board(2)*

4. Disconnect the two wireless LAN cables from the wireless LAN board.
5. Release the latches and remove the wireless LAN board from the wireless board.

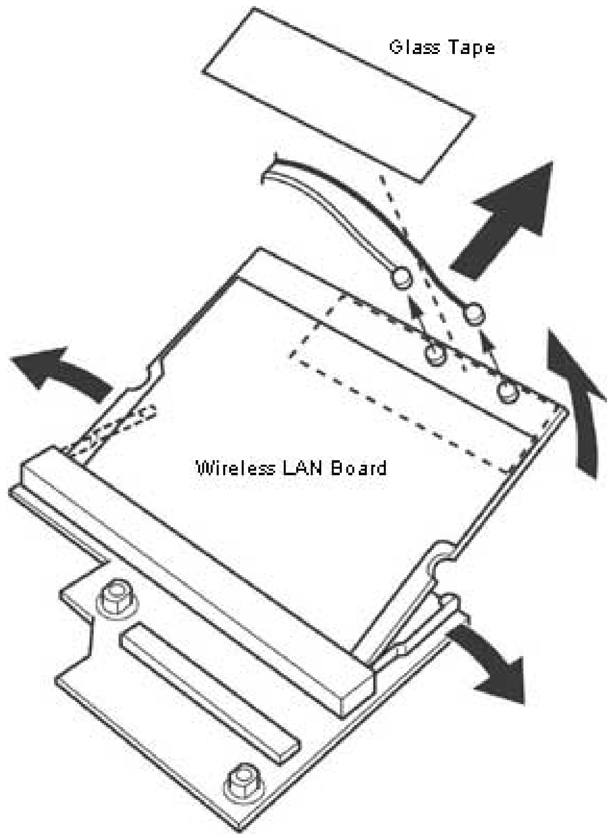



*Figure 4-21 Removing the wireless LAN board(3)*

### Installing the wireless LAN board

The following describes the procedure for installing the wireless LAN board (See Figures 4-19, 4-20, 4-21).

1. Install the wireless LAN board to the cable on the wireless board.
2. Connect the two wireless LAN cables to the wireless LAN board and apply the glass tape to secure them.
3. Connect the wireless board to PJ100 on the system board.
4. Turn over the computer and fix the wireless board with the following screws.

   - M2×4Z FLAT BIND screw x2 or x1
   - TORX screw 0 or x1

# 4.11 PC card slot

## Removing the PC card slot

The following describes the procedure for removing the PC card slot. (See Figure 4-22)

1. Remove the following screws fixing the PC card slot.

   - M2×4Z FLAT BIND screw x2

2. Release the lock of the connector PJ11 on the system board and remove the PC card slot.

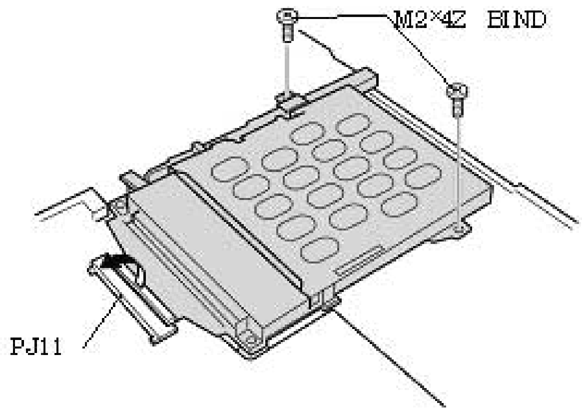



*Figure 4-22 Removing the PC card slot*

## Installing the PC card slot

The following describes the procedure for installing the PC card slot. (See Figure 4-22)

1. Connect the PC card slot to PJ11 on the system board and lock it.

2. Secure the PC card slot with the following screws.

   - M2×4Z FLAT BIND screw x2

# 4.12 LAN/MODEM jack

## Removing the LAN/MODEM jack

The following describes the procedure for removing the LAN/MODEM jack. (See Figure 4-23.)

1. Peel off the two glass tapes securing the MODEM cable.
2. Disconnect the LAN cable from PJ4100 on the system board.
3. Remove the LAN/MODEM jack from the slot.

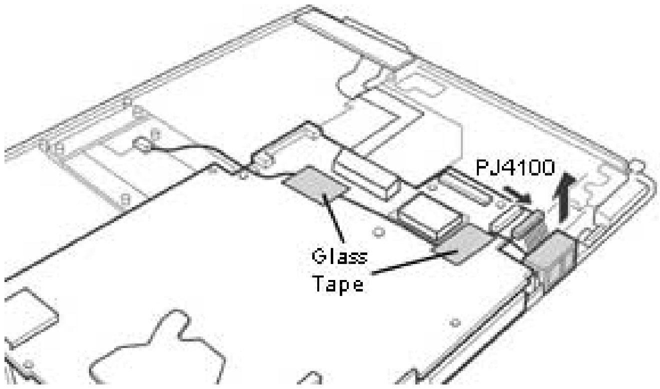



*Figure 4-23 Removing the LAN/MODEM jack*

## Installing the LAN/MODEM jack

The following describes the procedure for installing the LAN/MODEM jack. (See Figure 4-23.)

1. Install the LAN/MODEM jack to the slot.
2. Connect the LAN cable to PJ4100 on the system board.
3. Secure the MODEM cable with two glass tapes.

# 4.13 Sound board

## Removing the sound board

The following describes the procedure for removing the sound board. (See Figure 4-24.)

1. Lift up and remove the sound board and cover.
2. Disconnect the sound cable from PJ999 on the sound board.

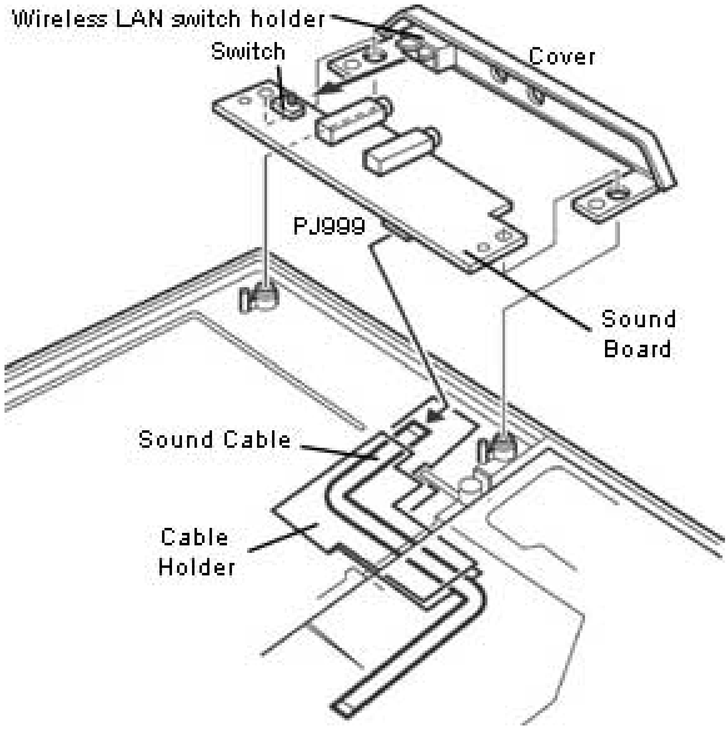



*Figure 4-24 Removing the sound board*

## Installing the sound board

The following describes the procedure for installing the sound board. (See Figure 4-24.)

1. Connect the sound cable to PJ999 on the sound board.
2. Install the sound board to the cover, fitting the position of the wireless LAN switch holder of the cover to the position of the sound board switch.
3. Install the cover (with the sound board) to the base, fitting to the guide pin. Pass the tip of the cable holder under the board.

# 4.14 System board/ FAN

## 4.14.1 System board

### Removing the system board

The following describes the procedure for removing the system board. (See Figures 4-25, 4-26)

1. Disconnect connectors PJ9, PJ334, and PJ7 from the system board.

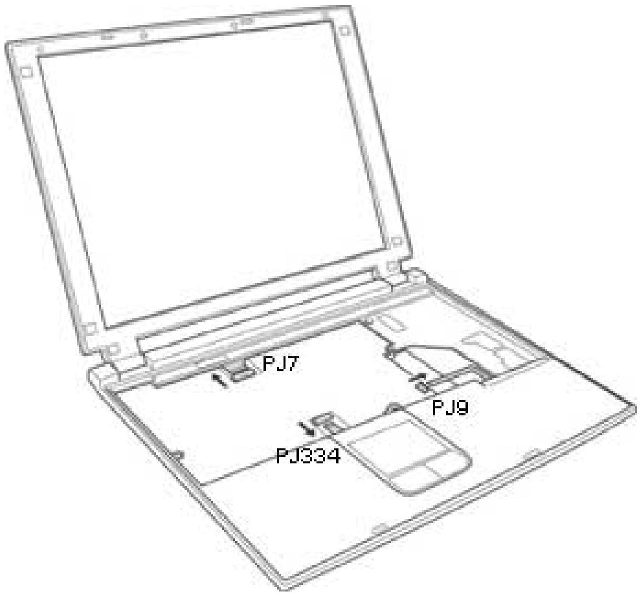



*Figure 4-25 Removing the system board (1)*

2. Turn over the computer and peel off the glass tape. Disconnect the LCD cable from PJ5600 and PJ5601 on the system board.

3. Remove the following screws securing the system board.

   - M2×4Z S-THIN HEAD screw x2

4. Remove the system board.

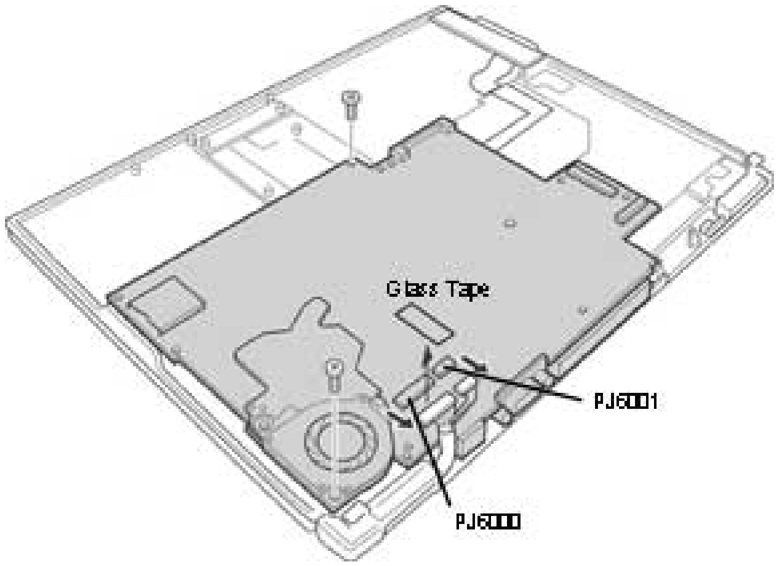



*Figure 4-26 Removing the system board (2)*

### Installing the system board

The following describes the procedure for installing the system board. (See Figures 4-25, 4-26.)

1. Install the system board and secure it with the following screws.

   - M2×4Z S-THIN HEAD screw x2

2. Connect the cables to PJ5600 and PJ5601 on the system board and apply the glass tape.

3. Turn over the computer and connect the cables to PJ9, PJ334, and PJ7 on the system board.

### 4.14.2 FAN

#### Removing the FAN

The following describes the procedure for removing the FAN. (See Figure 4-27.)

1. Peel off the cellophane tape and remove the FAN cable from PJ8780 on the system board.

2. Remove the following screws securing the FAN.

   - M2×4Z FLAT BIND screw x3

3. Remove the FAN.

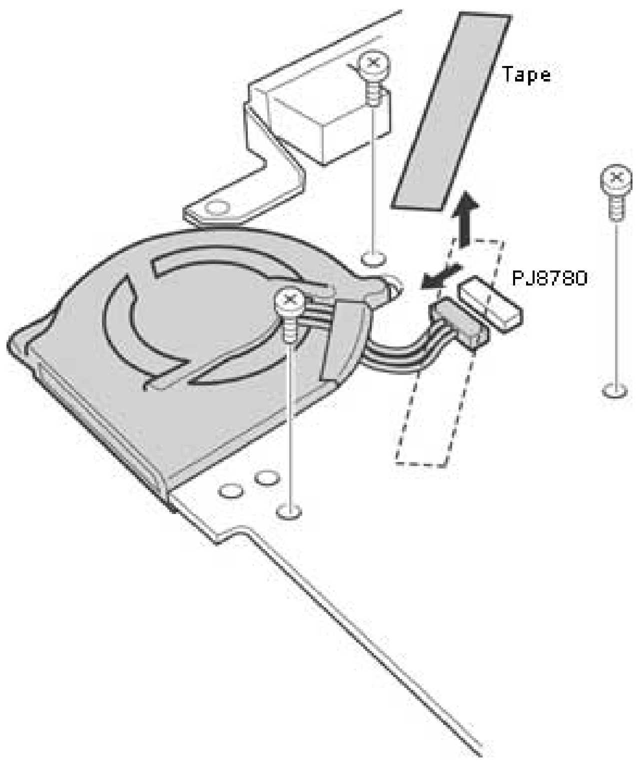



*Figure 4-27 Removing the FAN*

### Installing the FAN

The following describes the procedure for installing the FAN. (See Figures 4-27, 4-28.)

1. Use a soft cloth to remove the old silicon grease from the heat sink fin and CPU chip.

2. Apply new silicon grease to the heat sink fin and CPU chip using a dedicated injector. The face of CPU chip shall be covered completely with silicon grease.

> ***Caution:*** *When using a dedicated injector, completely cover the face of CPU chip with silicon grease.*

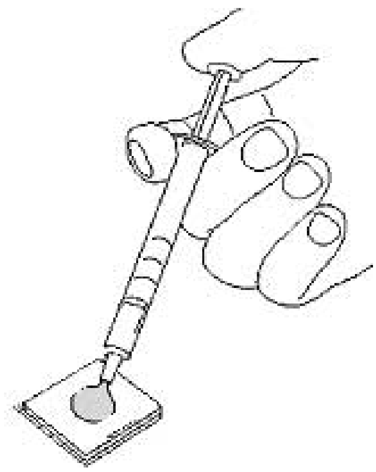


*Figure 4-28 Applying silicon grease*

3. Install the FAN and secure it with the following screws.

   - M2×4Z BIND screw x3

4. Connect the FAN cable to PJ8780 on the system board and apply the cellophane tape.

# 4.15 LED SW membrane

## Removing the LED SW membrane

The following describes the procedure for removing the LED SW membrane. (See Figure 4-29.)

1. Remove the following screws fixing the LED SW membrane and LED lens.

    - M2×3B S-THIN HEAD screw x2

2. Remove the LED SW membrane and LED lens.

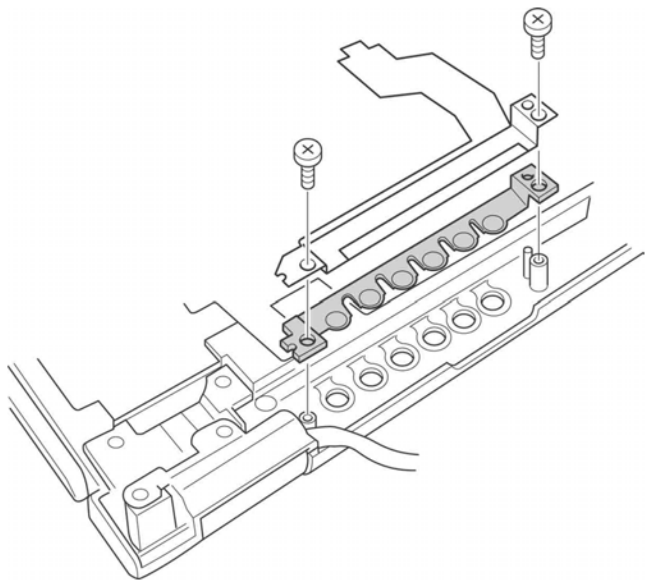


*Figure 4-29 Removing the LED SW membrane*

## Installing the LED SW membrane

The following describes the procedure for installing the LED SW membrane. (See Figure 4-29.)

1. Install the LED SW membrane and LED lens with the following screws.

    - M2×3B S-THIN HEAD screw x2

# 4.16 LCD mask/FL inverter/LCD

## 4.16.1 LCD mask

### Removing the LCD mask

The following describes the procedure for removing the LCD mask. (See Figure 4-30.)

1. Remove the six mask seals and four LCD cushions on the LCD mask, and remove the following screws.

   - M2×4Z S-THIN HEAD screw x10

2. Carefully insert the fingers of both hands between the mask and the LCD module and pry up to release the latches. Do one side at a time.

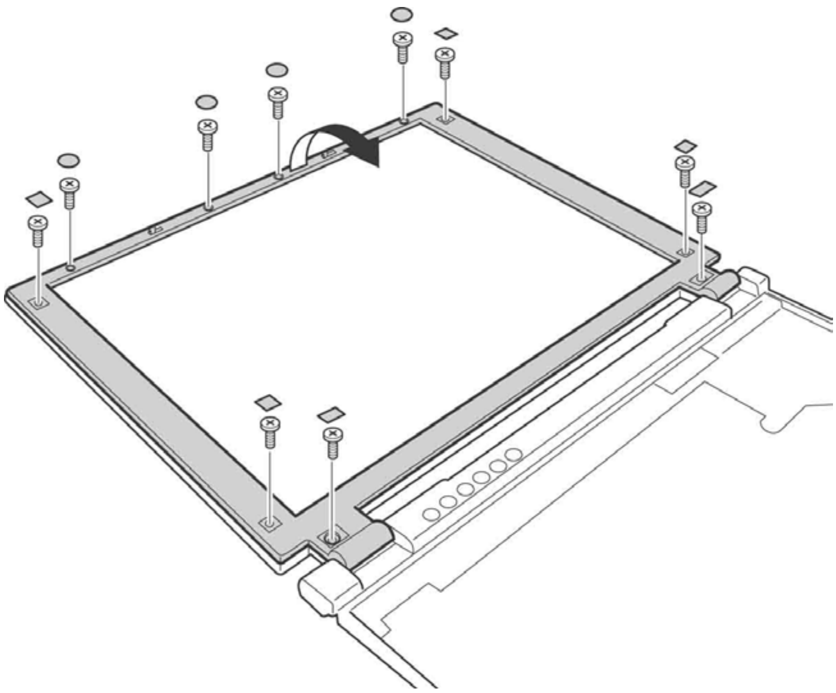


*Figure 4-30 Removing the LCD mask*

### Installing the LCD mask

The following describes the procedure for installing the LCD mask. (See Figure 4-30)

1. Install the LCD mask, pressing firmly all around the edges to secure the latches.
2. Secure the following screws to fix the LCD mask.
    - M2×4Z S-THIN HEAD screw x10
3. Replace the six LCD mask seals and 4 LCD cushions on the LCD mask.

### 4.16.2 FL inverter

#### Removing the FL inverter

The following describes the procedure for removing the FL inverter. (See Figure 4-31.)

1. Remove the following screw fixing the FL inverter.

   - M2×4Z FLAT HEAD screw x1

2. Disconnect the cable from the both sides of the connector and remove the FL inverter.

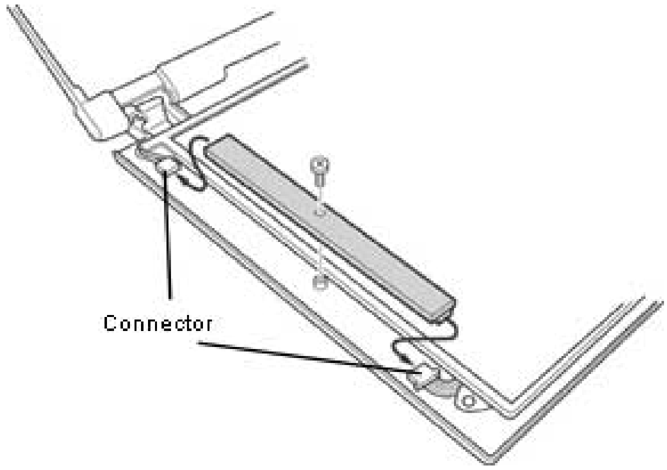



*Figure 4-31 Removing the FL inverter*

#### Installing the FL inverter

The following describes the procedure for installing the FL inverter. (See Figure 4-31.)

1. Connect the cable to both sides of the connector and install the FL inverter.

2. Install the following screw to fix the FL inverter.

   - M2×4Z FLAT HEAD screw x1

### 4.16.3 LCD

#### Removing the LCD

The following describes the procedure for removing the LCD. (See Figure 4-32.)

1. Lift the top of the LCD and peel off the glass tape.
2. Disconnect the LCD cable on the back and remove the LCD.

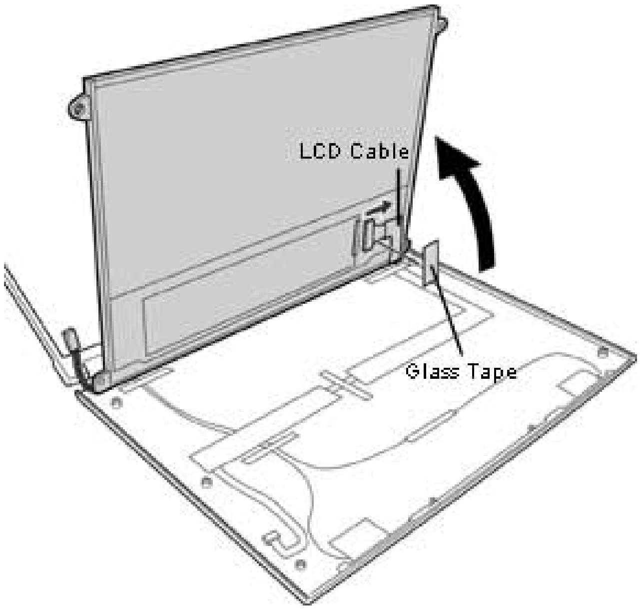



*Figure 4-32 Removing the LCD*

#### Installing the LCD

The following describes the procedure for installing the LCD. (See Figure 4-32.)

1. Connect the LCD cable on the back.
2. Replace the glass tape and install the LCD.

# 4.17 LCD cable/Wireless LAN cable/Antenna cover

## 4.17.1 LCD cable

### Removing the LCD cable

The following describes the procedure for removing the LCD cable. (See Figures 4-33, 4-34.)

1. Remove the following screw on the back of the palm lest cover and remove the LCD cable holder.

   - M2×3B S-THIN HEAD screw x1

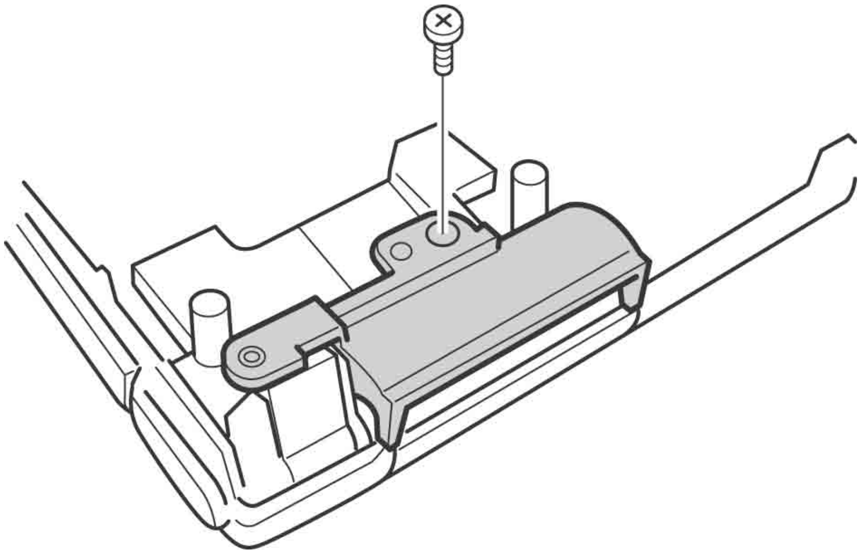


*Figure 4-33 Removing the LCD cable holder*

2. Peel off the three glass tapes securing the LCD cable on the LCD cover side.

3. Remove the following screws fixing both the hinges of the LCD cover and detach the LCD cover from the palmrest cover.

   - M3×3.5Z BIND screw x2 (on both the sides)
   - M2×4Z S-THIN HEAD screw x2 (on both the sides)

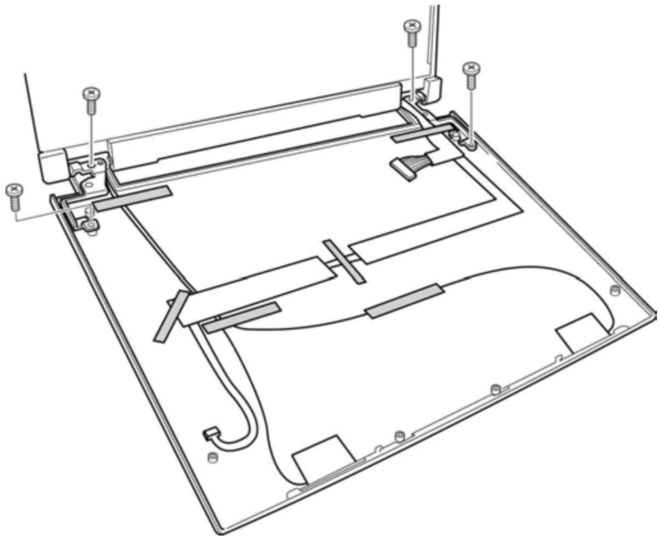


*Figure 4-34 Removing the LCD cable*

4. Pull out the LCD cable to the LCD cover.

## Installing the LCD cable

The following describes the procedure for installing the LCD cable. (See Figures 4-33, 4-34)

1. Pass the LCD cable from the LCD cover side to palmrest side and secure the following screws to fix both the hinges of the LCD cover side.

   - M3×3.5Z BIND screw x2 (on both the sides)
   - M2×4Z S-THIN HEAD screw x2 (on both the sides)

2. Apply the three glass tapes to secure the LCD cable in place.

3. Connect the palmrest side LCD cable (Pass under the LCD cable holder) and secure the following screw to fix the LCD cable holder.

   - M2×3B S-THIN HEAD screw x1

### 4.17.2 Wireless LAN cable/Antenna cover

#### Removing the Wireless LAN cable/Antenna cover

The following describes the procedure for removing the Wireless LAN cable. (See Figures 4-35, 4-36, 4-37.)

1. Remove the following screw securing the Wireless LAN cable holder on the backside of the palmrest cover.

   - M2×4Z S-THIN HEAD screw x1

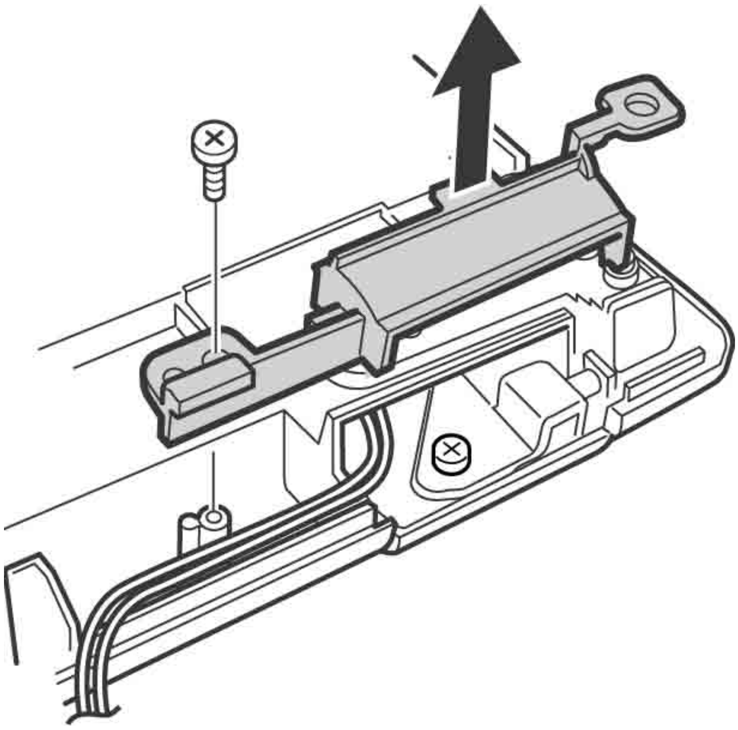


*Figure 4-35 Removing the Wireless LAN cable holder (1)*

2. Remove the following screws securing both the hinges on the LCD cover side and detach the LCD cover from the palmrest cover. (Same as when removing the LCD cable.)

3. Peel off the three glass tapes securing the Wireless LAN cable.

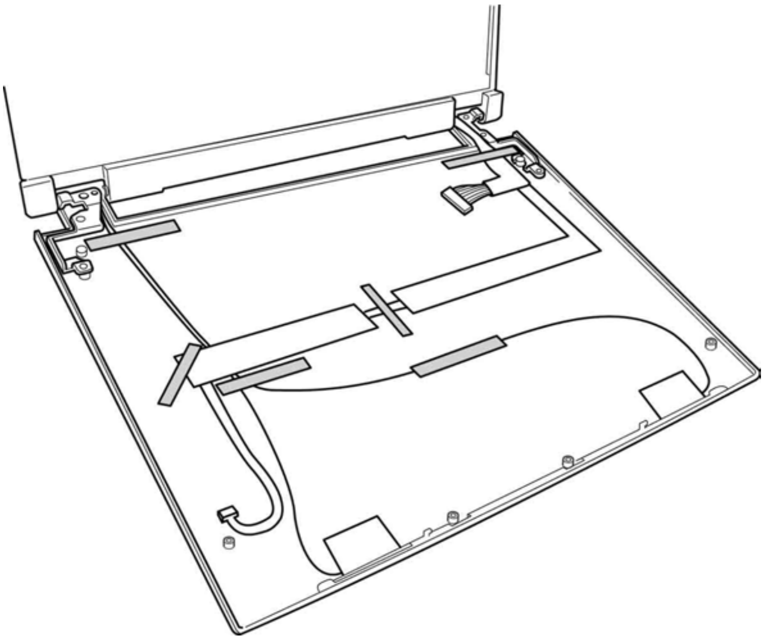


*Figure 4-36 Removing the Wireless LAN cable holder (2)*

4. Peel off both the wireless LAN antennas and pull out the wireless LAN cable to the LCD cover side.

5. Remove the antenna cover, releasing the four latches.

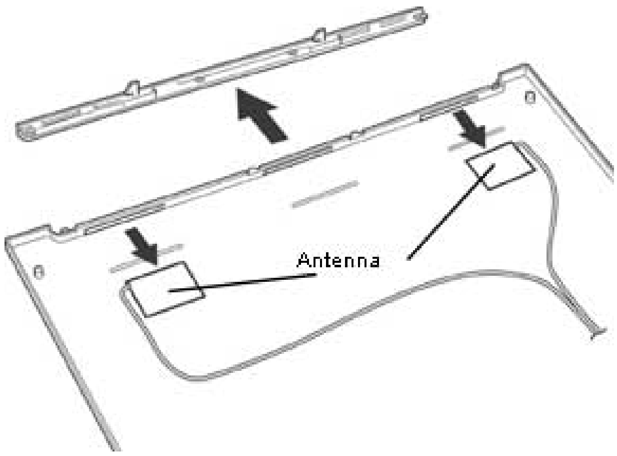



*Figure 4-37 Removing the antenna cover*

## Installing the Wireless LAN cable

The following describes the procedure for Installing the Wireless LAN cable. (See Figures 4-35, 4-36, 4-37.)

1. Apply the Wireless antenna fitting to the guide.
2. Pass the wireless antenna cable to the palmrest cover side, and install both the hinges to the LCD cover.
3. Apply three glass tapes to secure the wireless LAN antenna cable in place.
4. Set the wireless LAN cable of the palmrest side (Pass under the wireless LAN cable holder) and secure the following screw to fix the wireless LAN cable holder.
    - M2×4Z S-THIN HEAD screw x1
5. Install the antenna cover to the LCD cover.

# 4.18 Hinge

### Removing the palm lest cover hinge

The following describes the procedure for removing the palm lest cover hinge. (See Figures 4-38, 4-39)

1. Remove the following screws and the left side hinge.

   - M2.5×5Z S-THIN HEAD screw x1
   - M2.5x3SC U-THIN HEAD screw x2

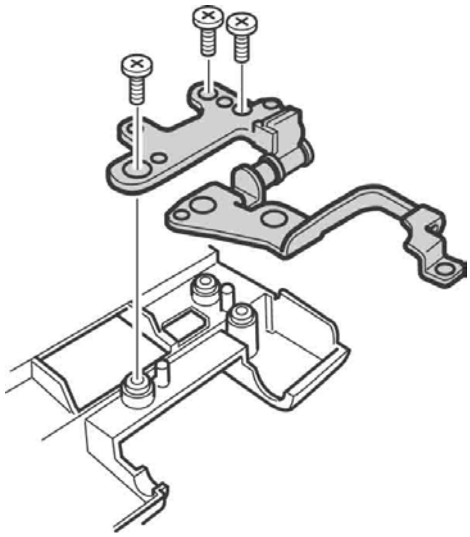


*Figure 4-38 Removing the palmrest cover left side hinge*

2. Remove the following screws, right side hinge and latch metal fitting.

   - M2.5×5Z S-THIN HEAD screw x1
   - M2.5x3SC U-THIN HEAD screw x2

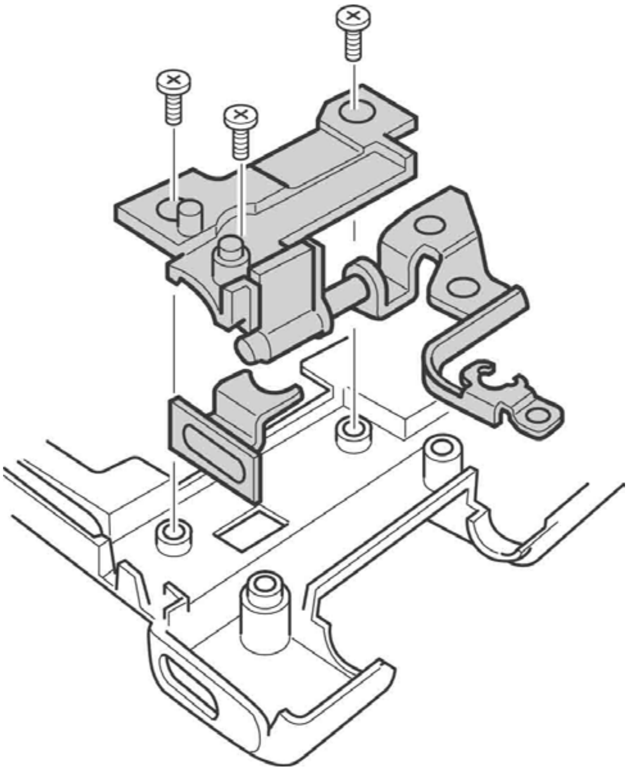


*Figure 4-39 Removing the palmrest cover right side hinge*

### Installing the palmrest cover hinge

The following describes the procedure for installing the palmrest cover hinge. (See Figures 4-38, 4-39.)

1. Install the left side hinge and secure it with the following screws.

   - M2.5×5Z S-THIN HEAD screw x1
   - M2.5x3SC U-THIN HEAD screw x2

2. Install the right side hinge and latch metal fittings and secure them with the following screws.

   - M2.5×5Z S-THIN HEAD screw x1
   - M2.5x3SC U-THIN HEAD screw x2

## 4.19 Fluorescent Lamp

This system uses LCD modules from the following supplier.

| Type | Part.No | Supplier | Section |
|---|---|---|---|
| 12.1 inch | G33C0000U110001 | Toshiba Matsushita | 4.19.1 |

***Note***: *- When working with an LCD module, always use a flat, grounded table.*

*- Handle the backlight unit in the environment without dust, such as on the clean bench. Keep the worktable free from any screws or other material that may scratch the LCD surface.*

*- Use an anti-static or protective sheet.*

*- When replacing the FL unit, cover with a finger protector or similar to prevent dirtying or scratching the LCD panel.*

*- Take care when handling the lamp. Excessive force may break the lamp.*

*- Take care not to deform the lamp reflector or allow it to get dirty.*

*- Ensure always that the power of the LCD module is turned off before connecting or disconnecting cables and connectors.*

### 4.19.1 Replacing the 12.1 Inch Toshiba Matsushita Fluorescent Lamp

The following describes the procedure for replacing the fluorescent lamp (See Figures 4-40 to 4-49).

Disassembling the module.

1. Peel off tapes and insulating sheets.

   1) Carefully place the module face up on a clean and flat worktable. To avoid scratching the face of the LCD module, make sure the table is free of dirt and dust. Place a protection sheet (soft cloth or similar item) over the front of the module.

   2) Remove the items indicated by the diagonal line in the figure.

> ***Caution:*** *1) Be careful not to damage the TAB, PCB, B/L and reflection sheet.*
> *2) Leave the insulation sheet on the bezel to reuse later.*
> *3) When peeling off the double-adhesive tape of the insulation sheet, be careful not to damage the TAB and PCB.*

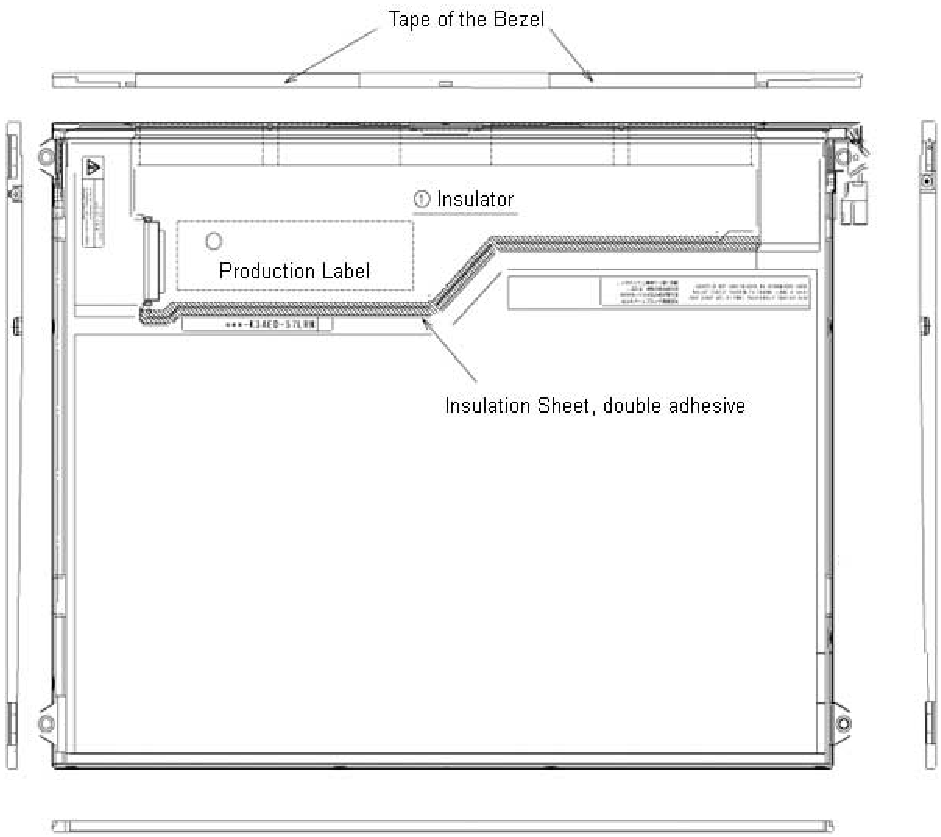



*Figure 4-40 Replacing Toshiba fluorescent lamp(1)*

2. Removing screws
   1) Spread out the insulation sheet without detaching from the bezel side, as shown in the figure below.

   2) Remove the left side screws and right side screws in the order ① shown in the figure below.

> ***Caution:*** *Use a Philips screwdriver with type 0 bit to remove the screws.*

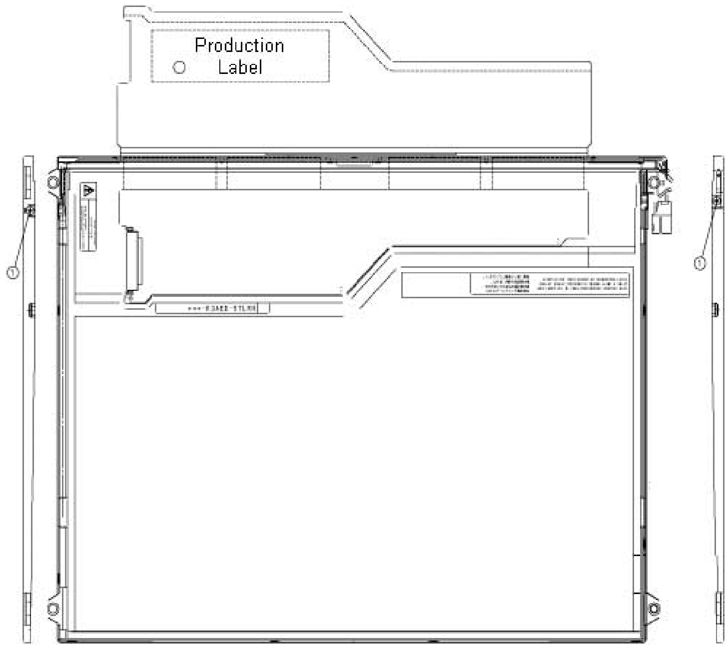



*Figure 4-41 Replacing Toshiba fluorescent lamp(2)*

3. Removing the bezel
   1) Place the module with the insulation sheet facing upwards.

   2) Release three latches of the upper bezel and frame. Release four latches (two each on both sides), peeling off the double-adhesive tape on the back of the bezel slowly, then remove the bezel.

   3) Release four latches of the bottom bezel and frame and slowly peel off the double-adhesive tape on the back of the bezel. (The bezel with double-adhesive tape will be reused.)

> **Caution:** 1) *When peeling off the latches and the double-faced tapes, be careful not to damage the TAB.*
>
> *2) When removing the bezel, do not break it and do not deform the bezel. (The bezel with double-adhesive tape will be reused.)*

4. Opening up the PCB
   1) Open the PCB to the horizontal position as shown in the figure below.

> **Caution:** *Be careful not to damage the FPC.*

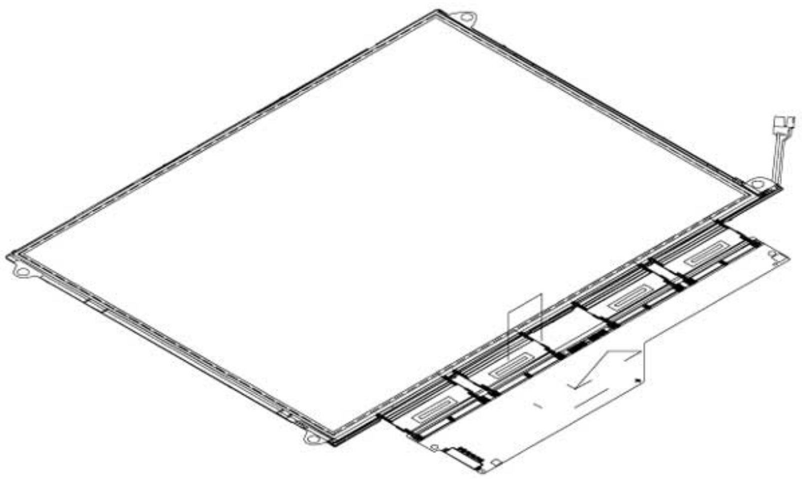


*Figure 4-42 Replacing Toshiba fluorescent lamp(4)*

5. Removing the cell with the PCB
   1) Remove the cell with the PCB from the backlight unit as shown in the figure below.

> ***Caution:*** *1) Peel off the cell carefully not to break it.*
> *2) Be careful not to damage the TAB.*

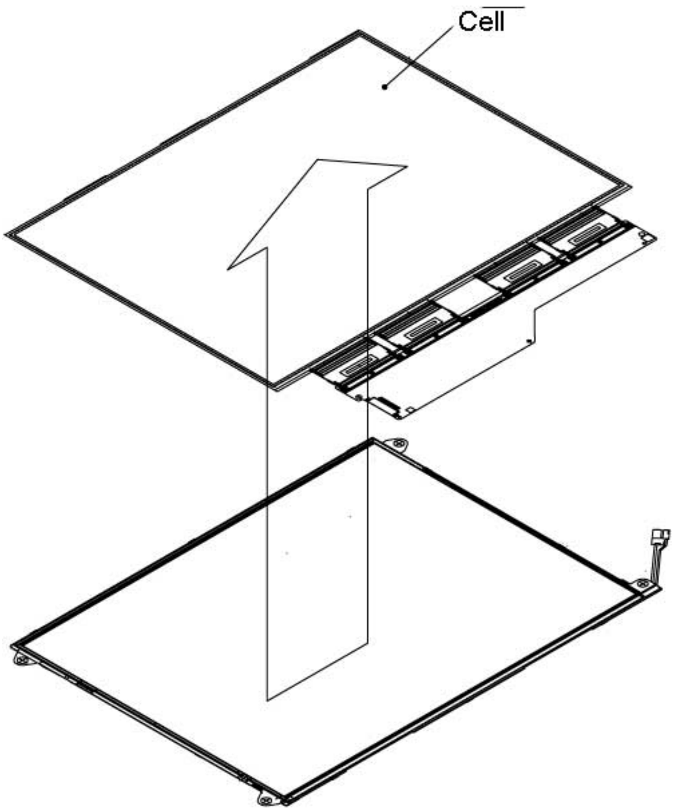



*Figure 4-43 Replacing Toshiba fluorescent lamp(5)*

Assembling the module

1. Checking the back-light

   1) Check the items shown in the figure below.

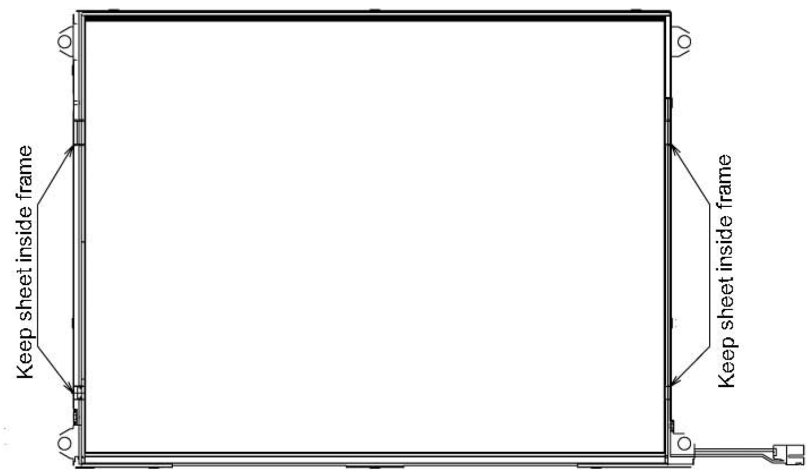



*Figure 4-44 Replacing Toshiba fluorescent lamp(6)*

2. Assembling the cell with the PCB.
   1) Illuminate the backlight.

   2) Make sure there are no scratches or dirt on the backlight. Also, check the back of the cell. Next, install the cell with the PCB to the backlight unit.

**Caution:** *1) Install by aligning the left side under the corner as shown below.*
*2) Be careful not to damage the FPC.*

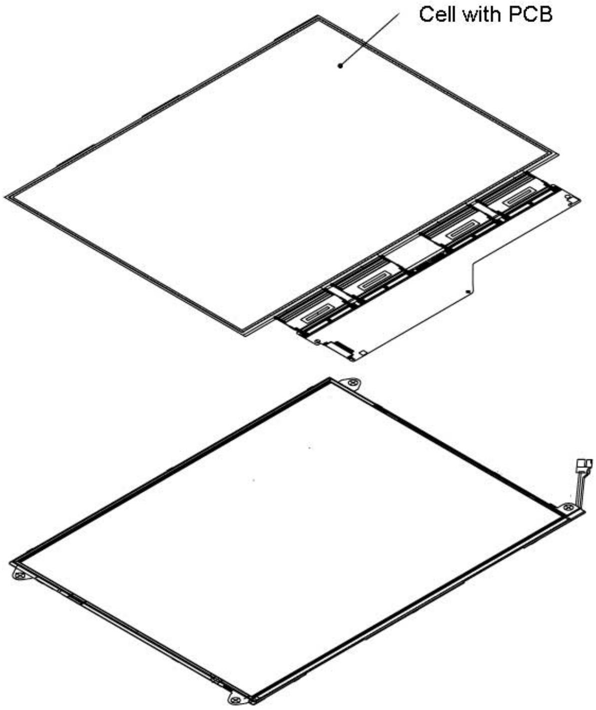



*Figure4-45 Replacing Toshiba fluorescent lamp(7)*

3. Folding and securing (temporary) the FPC (PCB).
   1) Fold the TAB (PCB) around the back of the backlight unit as shown in the figure below.

> ***Caution:*** *1) Be careful not to damage the TAB.*

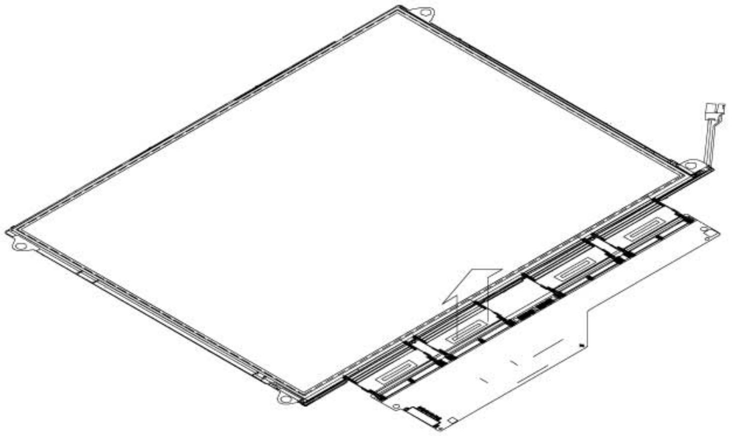


*Figure 4-46 Replacing Toshiba fluorescent lamp(8)*

4. Installing the bezel

   1) Install the bezel to the left under the frame. (as shown in the figure below 1.)

   2) Release the three latches at the bottom and apply the double-adhesive tape of the bottom bezel to the cell. (As shown in the figure below 2.)

   3) Set the left side bezel to the frame. (As shown in the figure below 3.)

   4) Engage the two latches each of the left and light side bezel. (As shown in the figure below 4.)

   5) Engage the four latches at the top and apply the double-adhesive tape of the top bezel to the cell. (As shown in the figure below 5.)

*1) Be careful not to damage the cell, TAB and P/L.*

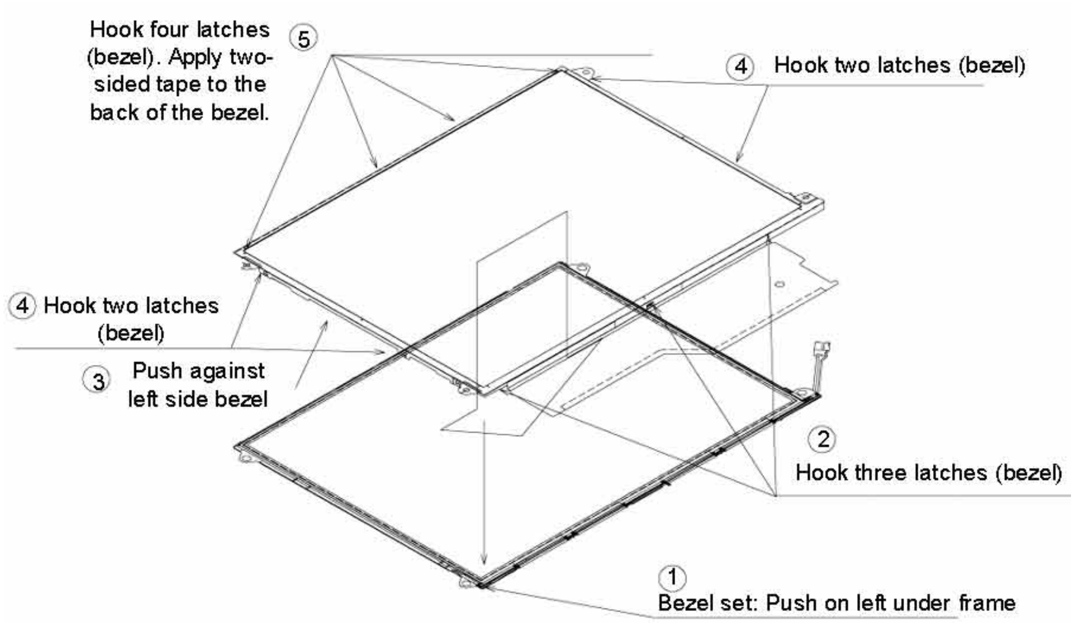



*Figure 4-47 Replacing Toshiba fluorescent lamp(9)*

5. Screwing the PCB and the bezel.
   1) Use two screws to secure the left and right edge in the order of (1).

> ***Caution:*** *1) The screw tightening torque is 0.167N·m(1.7kgf·cm) for all screws.*
> *2) Use a Philips screwdriver with type 0 bit.*

6. Installing the tapes and insulation sheets.
   1) Apply the double- adhesive tape of the insulation sheet.

> ***Caution:*** *1) Refer to the figure below.*
> *2) When sticking the insulation sheet, be careful not to damage the PCB, cell and B/L.*

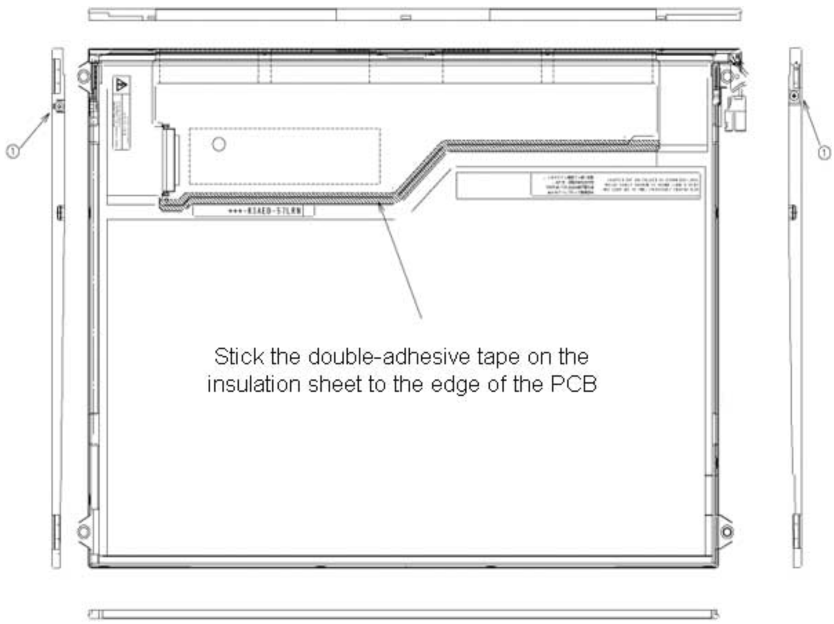



*Figure 4-48 Replacing Toshiba fluorescent lamp(10)*

# Appendices

# Appendix Contents

## Figures

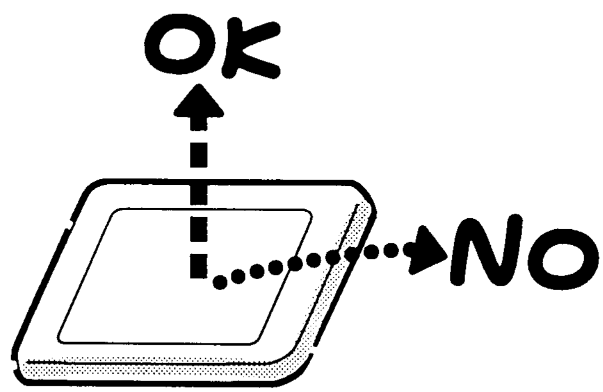
## Tables

# Appendix A Handling the LCD Module

## Precautions for handling the LCD module

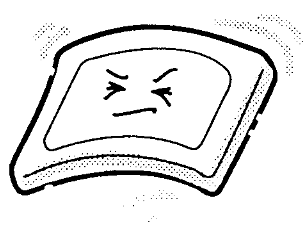
The LCD module can be easily damaged during assembly or disassembly. Observe the following precautions when handling the LCD module:

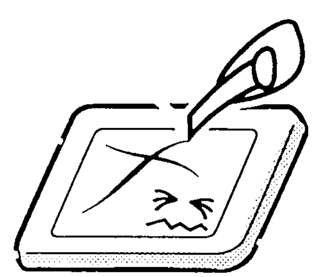
1. When installing the LCD module in the LCD cover, be sure to seat it so that it is properly aligned and maximum visibility of the display is maintained.




2. Be careful to align the holes at the four corners of the LCD module with the corresponding holes in the LCD cover before securing the module with screws. Do not force the module into place, because stress can affect its performance.

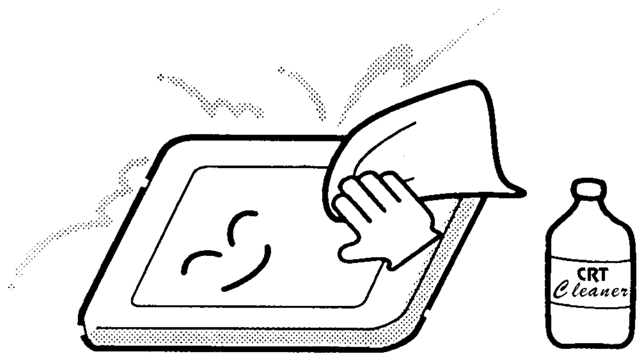
   Also, the panel's polarized surface is easily scarred, so be careful when handling it.



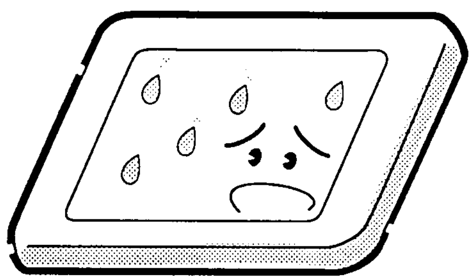


3. If the panel's surface gets dirty, wipe it with cotton or a soft cloth. If it is still dirty, try breathing on the surface to create a light condensate and wipe it again.

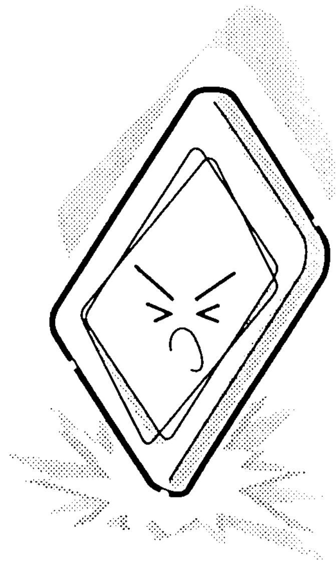
   If the surface is very dirty, we recommend a CRT cleaning agent. Apply the agent to a cloth and then wipe the panel's surface. Do not apply cleanser directly to the panel.



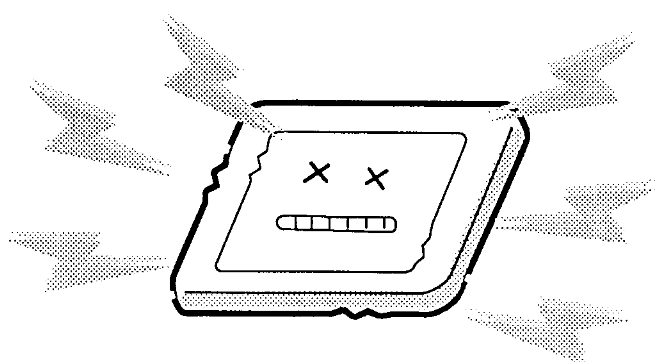

4. If water or other liquid is left on the panel's surface for a long period, it can change the screen's tint or stain it.  Be sure to quickly wipe off any liquid.



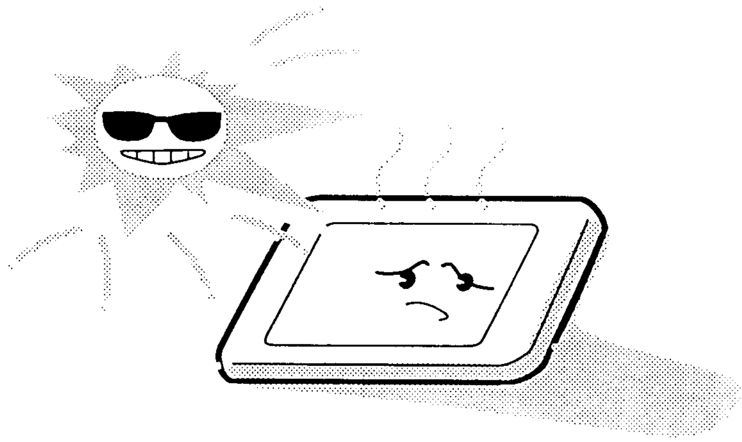
5. Glass is used in the panel, so be careful not to drop it or let it strike a hard object, which could cause breakage or cracks.



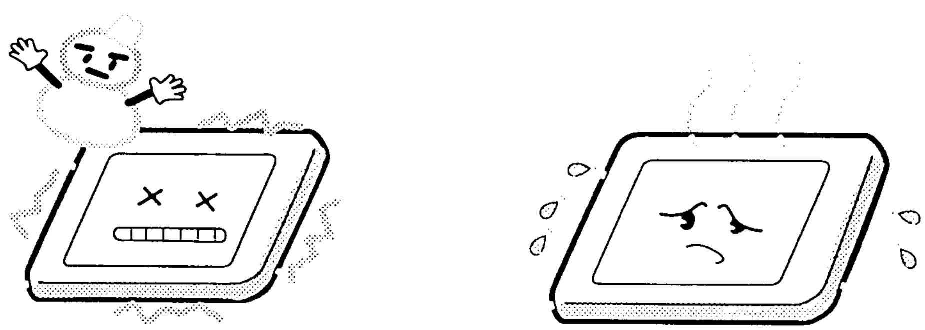
6. CMOS-LSI circuits are used in the module, so guard against damage from electrostatic discharge. Be sure to wear a wrist or ankle ground when handling the module.



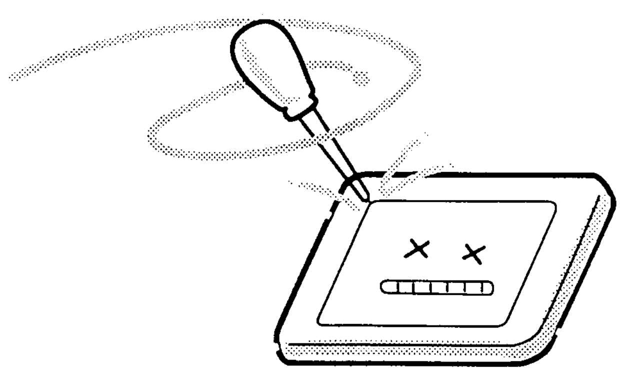
7. Do not expose the module to direct sunlight or strong ultraviolet rays for long periods.



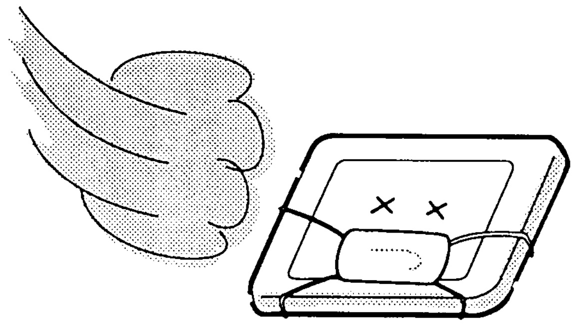
8. Do not store the module at temperatures below specifications. Cold can cause the liquid crystals to freeze, lose their elasticity or otherwise suffer damage.



9. Do not disassemble the LCD module. Disassembly can cause malfunctions.



10. If you transport the module, do not use packing material that contains epoxy resin (amine) or silicon glue (alcohol or oxime). These materials can release gas that can damage the panel's polarization.



# Appendix B Board Layout

## B.1 System board Front View

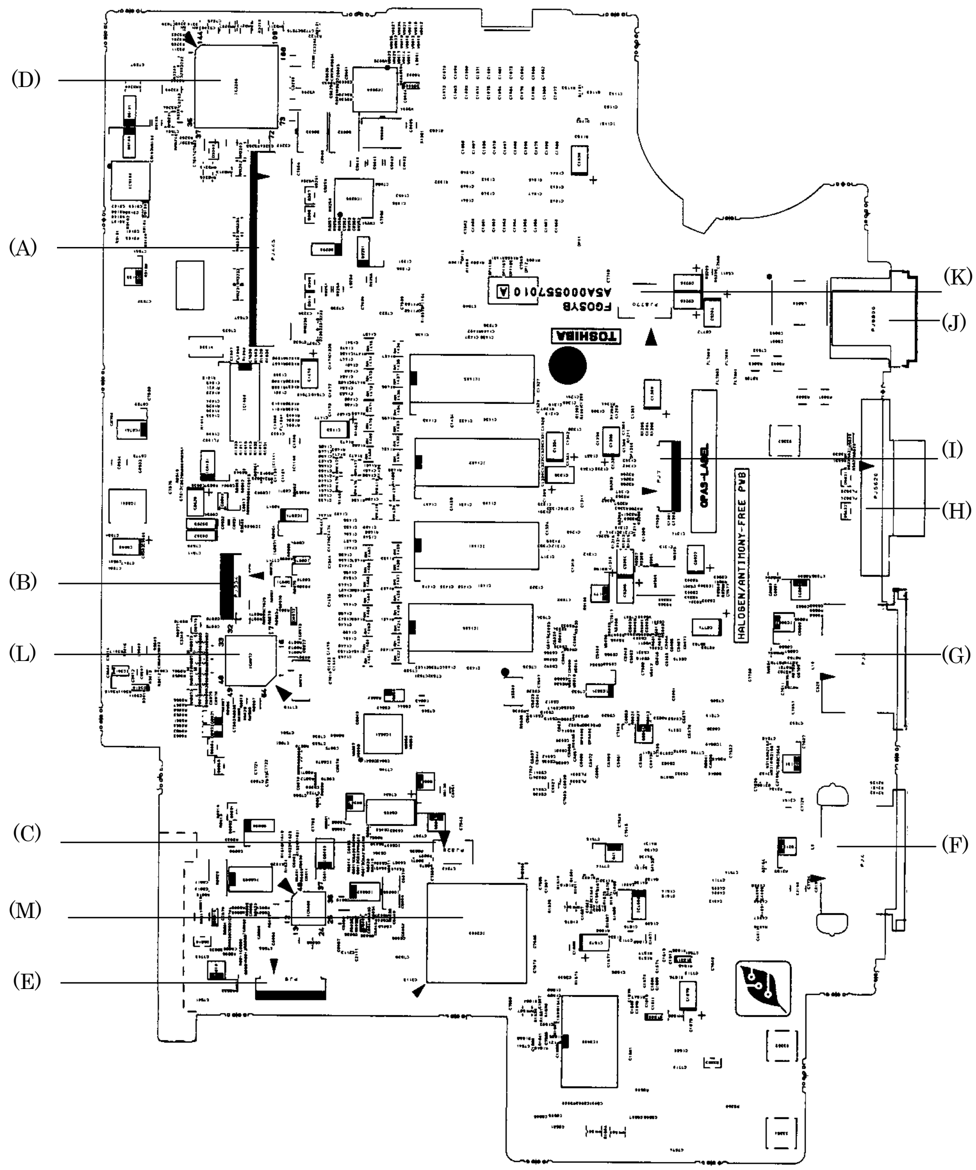



Figure B-1 System board layout (front)

*Table B-1 System board (front)*

| Mark | Number | Name |
|---|---|---|
| (A) | PJ445 | Keyboard connector |
| (B) | PJ334 | Touch pad connector |
| (C) | PJ325 | Debug port |
| (D) | IC3200 | EC/KBC |
| (E) | PJ9 | FL Board I/F connector |
| (F) | PJ4 | USB1 connector |
| (G) | PJ5 | USB2 connector |
| (H) | PJ5620 | External CRT connector |
| (I) | PJ7 | LED SW connector |
| (J) | PJ8800 | AC adapter connector |
| (K) | PJ8780 | Cooling fan connector |
| (L) | IC8972 | PSC |
| (M) | IC2000 | YEBISUSS |

## B.2 System board Back View

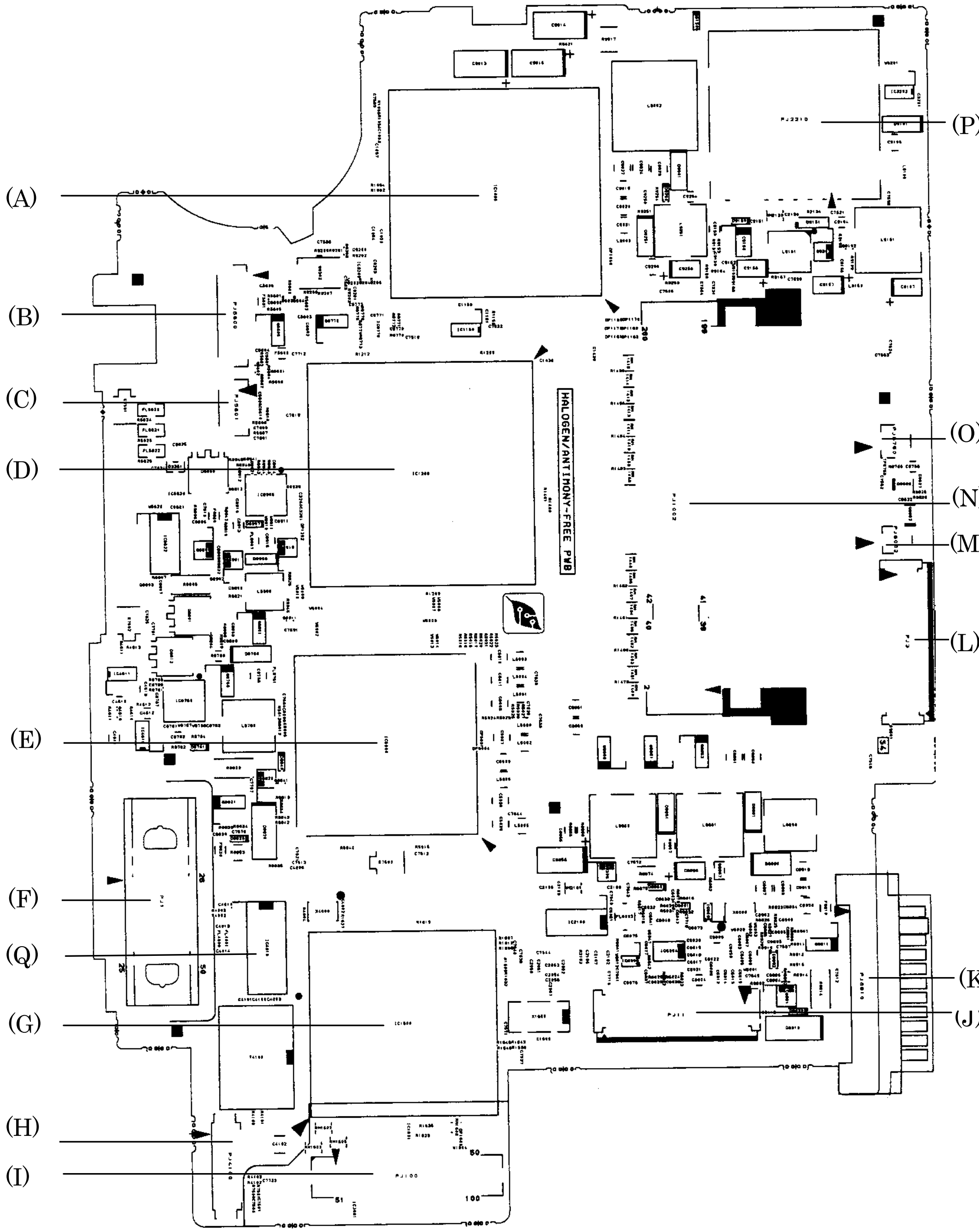
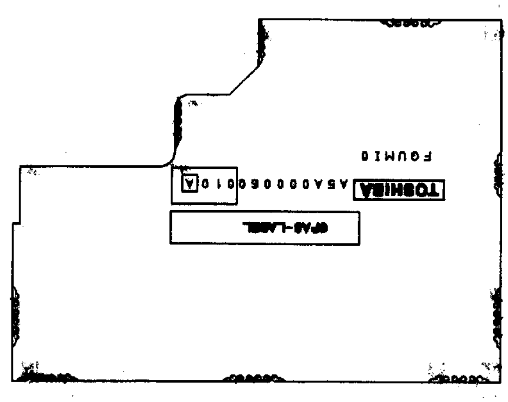



*Figure B-2 System board layout (Back)*

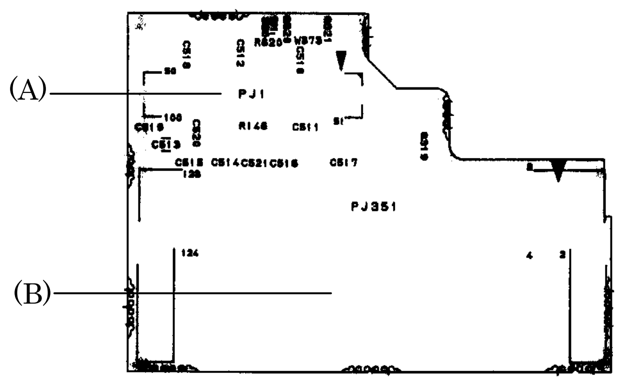
*Table B-2 System board (back)*

| Mark | Number | name |
|---|---|---|
| (A) | IC1005 | CPU |
| (B) | PJ5600 | LCD I/F connector |
| (C) | PJ5601 | FL inverter connector |
| (D) | IC1200 | ODEM |
| (E) | IC5000 | Trident XP4 |
| (F) | PJ1 | Docking I/F connector |
| (G) | IC1600 | ICH4-M |
| (H) | PJ4100 | Network connector |
| (I) | PJ100 | MI board I/F connector |
| (J) | PJ11 | PC card connector |
| (K) | PJ8810 | Battery connector |
| (L) | PJ3 | HD board I/F connector |
| (M) | PJ6002 | Speaker connector |
| (N) | PJ1002 | Expansion memory connector |
| (O) | PJ8760 | RTC battery connector |
| (P) | PJ2210 | SD card connector |
| (Q) | IC4010 | LAN controller |

## B.3 MI Board Front and Back View



(Front)



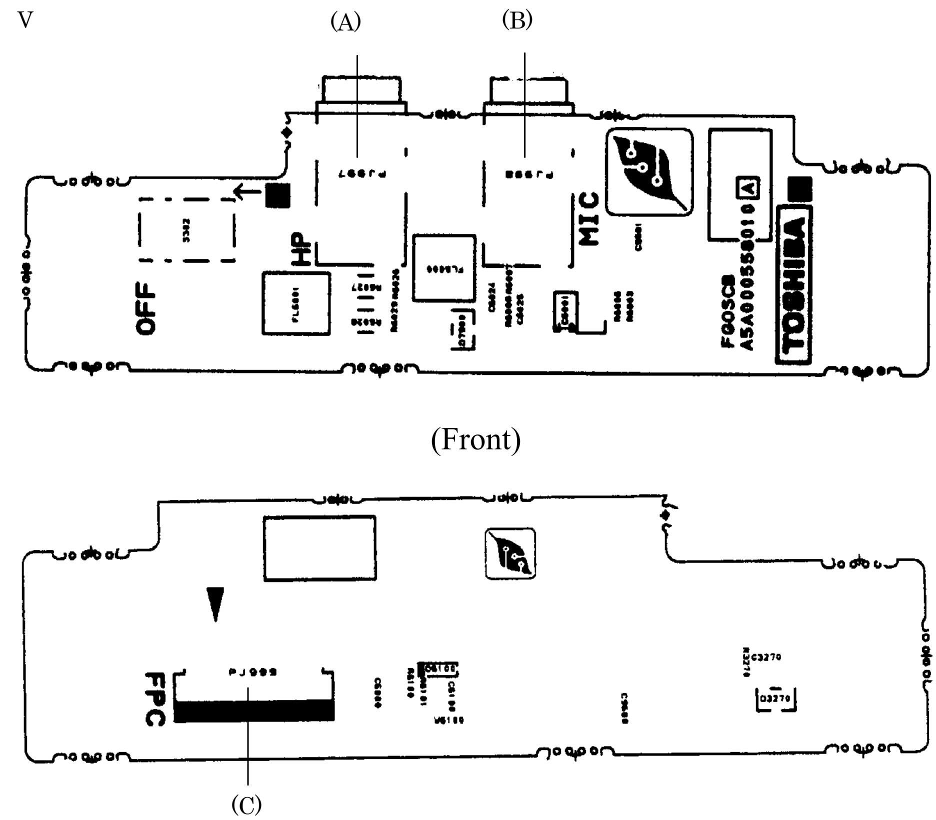

(Back)

Figure B-3 Antenna board layout

*Table B-3 Antenna board*

| Mark | Number | Name |
|---|---|---|
| (A) | PJ1 | Mini PCI I/F connector |
| (B) | PJ351 | System board I/F connector |

## B.4 SC Board Front and Back View




(Front)

(Back)

Figure B-4 Connector board layout

Table B-4 Connector board

| Mark | Number | Name |
|---|---|---|
| (A) | PJ997 | Headphone connector |
| (B) | PJ998 | External microphone connector |
| (C) | PJ999 | IL board I/F connector |

# Appendix C Pin Assignment

## System Board

### C.1 PJ5600 LCD connector (15pin)

*Table C-1 LCD connector (15pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal Name | I/O |
|---|---|---|---|---|---|
| 1 | PNL-P3V | O | 2 | PNL-P3V | O |
| 3 | TC1-P3N | O | 4 | TC1-P3P | O |
| 5 | GND | - | 6 | TCLK1-P3N | O |
| 7 | TCLK1-P3P | O | 8 | GND | - |
| 9 | TA1-P3N | O | 10 | TA1-P3P | O |
| 11 | GND | - | 12 | TB1-P3N | O |
| 13 | TB1-P3P | O | 14 | GND | - |
| 15 | GND | - | | | |

### C.2 PJ5601 FL Inverter connector (7pin)

*Table C-2 FL Inverter connector (7pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal Name | I/O |
|---|---|---|---|---|---|
| 1 | FL-P5V | O | 2 | FL-P5V | O |
| 3 | GND | - | 4 | GND | - |
| 5 | BRT2DA-S3P | O | 6 | BRT1-P5P | O |
| 7 | BRT0-P5P | O | | | |

## C.3 PJ5620 CRT I/F connector (15pin)

*Table C-3 CRT I/F connector (15pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal name | I/O |
|---|---|---|---|---|---|
| 1 | RED-PXP | O | 2 | GREEN-PXP | O |
| 3 | BLUE-PXP | O | 4 | N.C | - |
| 5 | GND | - | 6 | GND | - |
| 7 | GND | - | 8 | GND | - |
| 9 | P5V | - | 10 | GND | - |
| 11 | N.C | - | 12 | CRTSDA-P5P | I/O |
| 13 | SHSYNC-P5P | I/O | 14 | SVSYNC-P5P | O |
| 15 | CRTSCL-P5P | O | | | |

## C.4 PJ4 USB1 connector (4pin)

*Table C-4 USB1 connector (4pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal name | I/O |
|---|---|---|---|---|---|
| 1 | USBV0-E5V | O | 2 | USBP0-E3N | I/O |
| 3 | USBP0-E3P | I/O | 4 | GND | - |

## C.5 PJ5 USB2 connector (4pin)

*Table C-5 USB2 connector (4pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal Name | I/O |
|---|---|---|---|---|---|
| 1 | USBV1-E5V | O | 2 | USBP1-E3N | I/O |
| 3 | USBP1-E3P | I/O | 4 | GND | - |

## C.6 PJ325 Debug port connector (4pin)

*Table C-6 Debug port connector (4pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal name | I/O |
|---|---|---|---|---|---|
| 1 | B3V | - | 2 | DBGRX-B3P | I |
| 3 | DBGTX-B3P | O | 4 | GND | - |

## C.7 PJ11 PC Card Slot connector (80pin)

*Table C-7 PC Card Slot connector (80pin) (1/2)*

| Pin No. | Signal name | I/O | Pin No. | Signal name | I/O |
|---|---|---|---|---|---|
| 1 | GND | - | 2 | GND | - |
| 3 | ACAD00-BYP | I/O | 4 | ACCD1-B3N | I |
| 5 | ACAD01-BYP | I/O | 6 | ACAD2-BYP | I/O |
| 7 | ACAD03-BYP | I/O | 8 | ACAD4-BYP | I/O |
| 9 | ACAD05-BYP | I/O | 10 | ACAD06-BYP | I/O |
| 11 | ACAD07-BYP | I/O | 12 | GND | - |
| 13 | ACD14-BYP | I/O | 14 | ACCBE0-BYN | I/O |
| 15 | ACAD08-BYP | I/O | 16 | ACAD9-BYP | I/O |
| 17 | ACAD10-BYP | I/O | 18 | ACAD11-BYP | I/O |
| 19 | ACVS1-B3P | I/O | 20 | GND | - |
| 21 | ACAD12-BYP | I/O | 22 | ACAD13-BYP | I/O |
| 23 | ACAD14-BYP | I/O | 24 | ACAD15-BYP | I/O |
| 25 | ACCBE1-BYN | I/O | 26 | ACAD16-BYP | I/O |
| 27 | ACPAR-BYP | I/O | 28 | GND | - |
| 29 | ACA18-BYP | I/O | 30 | ACPERR-BYN | I/O |
| 31 | ACLOCK-BYN | I/O | 32 | ACGNT-BYN | O |
| 33 | ACSTOP-BYN | I/O | 34 | ACINT-BYN | I |
| 35 | ACDEVS-BYN | I/O | 36 | MCVCCA-BYV | O |
| 37 | MCVCCA-BYV | O | 38 | MCVCCA-BYV | O |
| 39 | MCVCCA-BYV | O | 40 | MCVCCA-BYV | O |

*Table C-7 PC Card Slot connector (80pin) (2/2)*

| Pin No. | Signal name | I/O | Pin No. | Signal name | I/O |
|---|---|---|---|---|---|
| 41 | MCVPPA-BYV | O | 42 | MCVPPA-BYV | O |
| 43 | MCVPPA-BYV | O | 44 | MCVPPA-BYV | O |
| 45 | MCVPPA-BYV | O | 46 | ACCLK-BYP | I/O |
| 47 | ACIRDY-BYN | I/O | 48 | ACIRDY-BYN | I/O |
| 49 | ACFRAM-BYN | I/O | 50 | ACCBE2-BYN | I/O |
| 51 | ACAD17-BYP | I/O | 52 | ACAD18-BYP | I/O |
| 53 | ACAD19-BYP | I/O | 54 | GND | - |
| 55 | ACAD20-BYP | I/O | 56 | ACVS2-B3P | I/O |
| 57 | ACAD21-BYP | I/O | 58 | ACRST-BYN | I/O |
| 59 | ACAD22-BYP | I/O | 60 | ACSERR-BYN | I/O |
| 61 | ACAD23-BYP | I/O | 62 | GND | - |
| 63 | ACREQ-BYN | I | 64 | ACAD24-BYP | I/O |
| 65 | ACCBE3-BYN | I/O | 66 | ACAD25-BYP | I/O |
| 67 | ACAUDI-BYP | I | 68 | ACAD26-BYP | I/O |
| 69 | ACSTSC-BYP | I | 70 | GND | - |
| 71 | ACAD27-BYP | I/O | 72 | ACAD28-BYP | I/O |
| 73 | ACAD29-BYP | I/O | 74 | ACAD30-BYP | I/O |
| 75 | ACD02-BYP | I/O | 76 | ACAD31-BYP | I/O |
| 77 | ACCLKR-BYN | I/O | 78 | ACCD2-B3N | I |
| 79 | GND | - | 80 | GND | - |

## C.8 PJ2210 SD Card connector (12pin)

*Table C-8 SD Card I/F connector (12pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal name | I/O |
|---|---|---|---|---|---|
| 1 | SDAT3-B3P | I/O | 2 | SDCMD-B3P | I/O |
| 3 | GND | - | 4 | SD-B3V | - |
| 5 | SDCLK-B3P | O | 6 | GND | - |
| 7 | SDAT0-B3P | I/O | 8 | SDAT1-B3P | I/O |
| 9 | SDAT2-B3P | I/O | 10 | SDCD-B3N | I |
| 11 | SDWP-B3P | I | 12 | GND | - |

## C.9 PJ7 LED SW connector (13pin)

*Table C-9 LED SW connector (13pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal name | I/O |
|---|---|---|---|---|---|
| 1 | BTLED-S3P | O | 2 | HDDLED-P3P | O |
| 3 | BAT2GR-S5N | O | 4 | BAT2DR-S5N | O |
| 5 | BAT1GR-S5N | O | 6 | BAT1DR-S5N | O |
| 7 | PWLEGR-S3P | O | 8 | PWLEDR-S3P | O |
| 9 | DCINGR-S5N | O | 10 | DCINOR-S5N | O |
| 11 | P5V | O | 12 | M5V | O |
| 13 | M5V | O | | | |

## C.10 PJ445 Keyboard connector (34pin)

*Table C-10 Keyboard connector (34pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal name | I/O |
|---|---|---|---|---|---|
| 1 | N.C. | - | 2 | N.C. | - |
| 3 | N.C. | - | 4 | N.C. | - |
| 5 | N.C. | - | 6 | N.C. | - |
| 7 | KBSC15-S3N | O | 8 | KBSC14-S3N | O |
| 9 | KBRT07-S3N | I | 10 | KBRT06-S3N | I |
| 11 | KBSC13-S3N | O | 12 | KBRT12-S3N | O |
| 13 | KBRT05-S3N | I | 14 | KBRT04-S3N | I |
| 15 | KBSC11-S3N | O | 16 | KBRT10-S3N | O |
| 17 | KBRT03-S3N | I | 18 | KBRT02-S3N | I |
| 19 | KBRT01-S3N | I | 20 | KBSC09-S3N | O |
| 21 | KBSC08-S3N | O | 22 | KBSC07-S3N | O |
| 23 | KBRT00-S3N | I | 24 | KBSC06-S3N | O |
| 25 | KBSC05-S3N | O | 26 | KBSC04-S3N | O |
| 27 | KBSC03-S3N | O | 28 | KBSC02-S3N | O |
| 29 | KBSC01-S3N | O | 30 | KBSC00-S3N | O |
| 31 | P5V | - | 32 | CAPLED-P5N | O |
| 33 | ARWLED-P5N | O | 34 | NUMLED-P5N | O |

## C.11 PJ334 PAD connector (5pin)

*Table C-11 PAD connector (5pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal Name | I/O |
|---|---|---|---|---|---|
| 1 | GND | - | 2 | IPDCLK-P5P | I/O |
| 3 | IPDDAT-P5P | I/O | 4 | N.C. | - |
| 5 | P5V | - | | | |

## C.12 PJ9 FL board I/F connector (13pin)

*Table C-12 FL board I/F connector (13pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal Name | I/O |
|---|---|---|---|---|---|
| 1 | S3V | - | 2 | BTSWON-S3P | I |
| 3 | GND | - | 4 | GND | - |
| 5 | A-GND | - | 6 | HEADL-PXP | O |
| 7 | A-GND | - | 8 | HEADR-PXP | O |
| 9 | A-GND | - | 10 | HPIN-P5P | I |
| 11 | 25VREF-P2V | - | 12 | MICIN-PXP | I |
| 13 | A4R7-P4V | - | | | |

## C.13 PJ6002 Speaker I/F connector (2pin)

*Table C-13 Speaker I/F connector (2pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal name | I/O |
|---|---|---|---|---|---|
| 1 | VO- | O | 2 | VO+ | O |

## C.14 PJ100 MI Board I/F connector (100pin)

*Table C- 14 MI Board I/F connector (100pin) (1/2)*

| Pin No. | Signal name | I/O | Pin No. | Signal name | I/O |
|---|---|---|---|---|---|
| 1 | GND | - | 2 | GND | - |
| 3 | GND | - | 4 | PIRQD-P3N | O |
| 5 | N.C. | - | 6 | PCIRST-S3N | O |
| 7 | P3V | - | 8 | PGNT2-P3N | O |
| 9 | GND | - | 10 | PME-S3N | I/O |
| 11 | N.C. | - | 12 | AD30-P3P | I/O |
| 13 | P3V | - | 14 | AD28-P3P | I/O |
| 15 | AD25-P3P | I/O | 16 | AD24-P3P | I/O |
| 17 | AD26-P3P | I/O | 18 | GND | - |
| 19 | AD22-P3P | I/O | 20 | AD20-P3P | I/O |
| 21 | PAR-P3P | | 22 | AD18-P3P | I/O |
| 23 | AD16-P3P | I/O | 24 | GND | - |
| 25 | FRAME-P3N | I/O | 26 | TRDY-P3N | I/O |
| 27 | STOP-P3N | I/O | 28 | P3V | - |
| 29 | DEVSEL-P3N | I/O | 30 | GND | - |
| 31 | AD15-P3P | I/O | 32 | AD13-P3P | I/O |
| 33 | AD11-P3P | I/O | 34 | GND | - |
| 35 | AD09-P3P | I/O | 36 | CBEO-P3N | I/O |
| 37 | P3V | - | 38 | AD06-P3P | I/O |
| 39 | AD04-P3P | I/O | 40 | AD02-P3P | I/O |
| 41 | AD00-P3P | I/O | 42 | GND | - |
| 43 | N.C. | - | 44 | B3V | - |
| 45 | B3V | - | 46 | B3V | - |
| 47 | N.C. | - | 48 | N.C. | - |
| 49 | P5V | - | 50 | P5V | - |
| 51 | GND | - | 52 | X33MPC-P3P | O |
| 53 | GND | - | 54 | WLON-S3N | O |
| 55 | PIRQA-P3N | I/O | 56 | PREQ2-P3N | I |
| 57 | AD31-P3P | I/O | 58 | GND | - |
| 59 | AD29-P3P | I/O | 60 | AD27-P3P | I/O |

*Table C-14 MI Board I/F connector (100pin) (2/2)*

| Pin No. | Signal name | I/O | Pin No. | Signal name | I/O |
|---|---|---|---|---|---|
| 61 | AD25-P3P | I/O | 62 | P3V | - |
| 63 | CBE3-P3N | I/O | 64 | AD23-P3P | I/O |
| 65 | GND | - | 66 | AD21-P3P | I/O |
| 67 | AD19-P3P | I/O | 68 | GND | - |
| 69 | AD17-P3P | I/O | 70 | CBE2-P3N | I/O |
| 71 | IRDY-P3N | I/O | 72 | GND | - |
| 73 | CLKRUN-P3N | I/O | 74 | SERR-P3N | I/O |
| 75 | P3V | - | 76 | PERR-P3N | I/O |
| 77 | CBE1-P3N | I/O | 78 | AD14-P3P | I/O |
| 79 | GND | - | 80 | AD12-P3P | I/O |
| 81 | N.C. | - | 82 | GND | - |
| 83 | N.C. | - | 84 | N.C. | - |
| 85 | P3V | - | 86 | AD10-P3P | I/O |
| 87 | AD08-P3P | I/O | 88 | GND | - |
| 89 | AD07-P3P | I/O | 90 | AD05-P3P | I/O |
| 91 | P3V | - | 92 | N.C. | - |
| 93 | GND | - | 94 | AD03-P3P | I/O |
| 95 | AD01-P3P | I/O | 96 | GND | - |
| 97 | GND | - | 98 | N.C. | - |
| 99 | P5V | - | 100 | P5V | - |

## C.15 PJ4100 Network I/F connector (10pin)

*Table C-15 Network I/F connector (10pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal name | I/O |
|---|---|---|---|---|---|
| 1 | TDP-E3P | O | 2 | TDN-E3N | O |
| 3 | RDP-E3P | I | 4 | RDN-E3N | I |
| 5 | | | 6 | | |
| 7 | LAN-E3V | - | 8 | LAN-E3V | - |
| 9 | ACT-E3N | O | 10 | LNK-E3N | O |

## C.16 PJ1 Docking I/F connector (50pin)

*Table C-16 Docking I/F connector (50pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal name | I/O |
|---|---|---|---|---|---|
| 1 | DOCDT2-S3N | I | 2 | BT2VD | O |
| 3 | BT2VD | O | 4 | PSCL-S5P | I/O |
| 5 | D-E3V | - | 6 | CDCHG2-S5P | O |
| 7 | GND | - | 8 | GND | - |
| 9 | GND | - | 10 | GND | - |
| 11 | DOCSCL-P5P | I/O | 12 | D-E5V | - |
| 13 | D-E5V | - | 14 | D-E5V | - |
| 15 | DRED-PXP | O | 16 | DGREEN-PXP | O |
| 17 | DBLUE-PXP | O | 18 | DHSYNC-P5P | O |
| 19 | GND | - | 20 | ACT-E3N | O |
| 21 | EJCTRQ-S3N | I | 22 | VOID | - |
| 23 | VOID | - | 24 | TXP-EXP | O |
| 25 | TXN-EXN | O | 26 | GND | - |
| 27 | DBT20V-S5N | O | 28 | BTMP2-SXP | O |
| 29 | PSDA-S5P | I/O | 30 | D-E3V | - |
| 31 | PWRSW-S3N | O | 32 | GND | - |
| 33 | USBP2-E3P | I/O | 34 | USBP2-E3N | I/O |
| 35 | GND | - | 36 | DOCSDA-P5P | O |
| 37 | D-E5V | - | 38 | D-E5V | - |
| 39 | D-E5V | - | 40 | GND | - |
| 41 | GND | - | 42 | GND | - |
| 43 | DVSYNC-P5P | O | 44 | LAN-E3V | - |
| 45 | LNK-E3N | O | 46 | DOCDT1-S3N | I |
| 47 | VOID | - | 48 | VOID | - |
| 49 | RXP-EXP | O | 50 | RXN-EXN | O |

## C.17 PJ8800 DC-IN connector (2pin)

*Table C-17 DC-IN connector (2pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal name | I/O |
|---|---|---|---|---|---|
| 1 | ADPDC | I | 2 | (GND) | - |

## C.18 PJ8810 Battery connector (10pin)

*Table C-18 Battery connector (10pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal name | I/O |
|---|---|---|---|---|---|
| 1 | [+] | - | 2 | BTMP1 | O |
| 3 | DCHG | O | 4 | M5V | O |
| 5 | PSCL-S5P | I/O | 6 | PSDA-S5P | I/O |
| 7 | GND | - | 8 | DBT10V-S5N | I |
| 9 | GND | - | 10 | GND | - |

## C.19 PJ8760 RTC battery connector (3pin)

*Table C-19 RTC battery connector (3-pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal name | I/O |
|---|---|---|---|---|---|
| 1 | (Vbat) | - | 2 | N.C | - |
| 3 | GND | - | | | |

## C.20 PJ8780 FAN connector (3pin)

*Table C-20 FAN connector (3pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal name | I/O |
|---|---|---|---|---|---|
| 1 | FAN VCC | O | 2 | GND | - |
| 3 | FANG—P3P | I | | | |

## C.21 PJ3 HD Board I/F connector (80pin)

*Table C- 21 HD Board I/F connector (80pin) (1/2)*

| Pin No. | Signal name | I/O | Pin No. | Signal name | I/O |
|---|---|---|---|---|---|
| 1 | GND | - | 2 | GND | - |
| 3 | N.C. | - | 4 | N.C. | - |
| 5 | P3V | - | 6 | P3V | - |
| 7 | P3V | - | 8 | P3V | - |
| 9 | GND | - | 10 | P3V | - |
| 11 | N.C. | - | 12 | N.C. | - |
| 13 | GND | - | 14 | N.C. | - |
| 15 | HDDLED-P3N | I | 16 | N.C. | - |
| 17 | PDCS3-P3N | O | 18 | PDCS1-P3N | O |
| 19 | PDA2-P3P | O | 20 | PDA0-P3P | O |
| 21 | PDA1-P3P | O | 22 | GND | - |
| 23 | GND | - | 24 | GND | - |
| 25 | IRQ14-P3P | I/O | 26 | PDDACK-P3N | O |
| 27 | GND | - | 28 | PIORDY-P3P | I |
| 29 | GND | - | 30 | GND | - |
| 31 | GND | - | 32 | PDIOR-P3N | O |
| 33 | PDIOW-P3N | O | 34 | PDDREQ-P3P | I |
| 35 | GND | - | 36 | GND | - |
| 37 | GND | - | 38 | PDD15-P3P | I/O |
| 39 | PDD00-P3P | I/O | 40 | PDD14-P3P | I/O |
| 41 | PDD01-P3P | I/O | 42 | PDD13-P3P | I/O |
| 43 | GND | - | 44 | GND | - |
| 45 | GND | - | 46 | PDD02-P3P | - |
| 47 | PDD12-P3P | I/O | 48 | PDD03-P3P | I/O |
| 49 | PDD11-P3P | I/O | 50 | GND | - |
| 51 | GND | - | 52 | GND | - |
| 53 | PDD04-P3P | I/O | 54 | PDD10-P3P | I/O |
| 55 | PDD05-P3P | I/O | 56 | PDD09-P3P | I/O |
| 57 | GND | - | 58 | GND | - |
| 59 | GND | - | 60 | PDD06-P3P | I/O |

*Table C-21 HD Board I/F connector (80pin) (2/2)*

| Pin No. | Signal name | I/O | Pin No. | Signal name | I/O |
|---|---|---|---|---|---|
| 61 | PDD08-P3P | I/O | 62 | PDD07-P3P | I/O |
| 63 | IDRSTA-P3N | O | 64 | GND | - |
| 65 | GND | - | 66 | GND | - |
| 67 | N.C. | - | 68 | N.C. | - |
| 69 | MDC-B3V | O | 70 | MDC-B3V | O |
| 71 | M97SY2-P3P | O | 72 | M970T2-P3P | O |
| 73 | GND | - | 74 | M97IN2-B3P | I |
| 75 | X97BC2-P3P | I/O | 76 | M97RS2-S3N | O |
| 77 | GND | - | 78 | MDMP-BXP | I |
| 79 | GND | - | 80 | GND | - |

## C.22 PJ1002 Memory connector (200pin)

*Table C-22 Memory connector (200pin) (1/4)*

| Pin No. | Signal name | I/O | Pin No. | Signal name | I/O |
|---|---|---|---|---|---|
| 1 | MR1R25-P1V | - | 2 | MR1R25-P1V | - |
| 3 | GND | - | 4 | GND | - |
| 5 | SDQ05R-B2P | I/O | 6 | SDQ01R-B2P | I/O |
| 7 | SDQ00R-B2P | I/O | 8 | SDQ04R-B2P | I/O |
| 9 | 2R5-B2V | - | 10 | 2R5-B2V | - |
| 11 | SDQS0R-B2P | I/O | 12 | GND | |
| 13 | SDQ06R-B2P | I/O | 14 | SDQ07R-B2P | - |
| 15 | GND | - | 16 | GND | - |
| 17 | SDQ03R-B2P | I/O | 18 | SDQ02R-B2P | I/O |
| 19 | SDQ09R-B2P | I/O | 20 | SDQ08R-B2P | I/O |
| 21 | 2R5-B2V | I/O | 22 | 2R5-B2V | - |
| 23 | SDQ13R-B2P | I/O | 24 | SDQ12R-B2P | I/O |
| 25 | SDQS1R-B2P | I/O | 26 | GND | - |
| 27 | GND | - | 28 | GND | - |
| 29 | SDQ15R-B2P | I/O | 30 | SDQ10R-B2P | I/O |
| 31 | SDQ14R-B2P | I/O | 32 | SDQ11R-B2P | I/O |
| 33 | 2R5-B2V | - | 34 | 2R5-B2V | - |
| 35 | CSK3-B2P | O | 36 | 2R5-B2V | - |
| 37 | CSK3-B2N | O | 38 | GND | - |
| 39 | GND | - | 40 | GND | - |
| 41 | SDQ21R-B2P | I/O | 42 | SDQ16R-B2P | I/O |
| 43 | SDQ17R-B2P | I/O | 44 | SDQ20R-B2P | I/O |
| 45 | 2R5-B2V | - | 46 | 2R5-B2V | - |
| 47 | SDQS2R-B2P | I/O | 48 | GND | - |
| 49 | SDQ23R-B2P | I/O | 50 | SDQ18R-B2P | I/O |
| 51 | GND | - | 52 | GND | - |
| 53 | SDQ19R-B2P | I/O | 54 | SDQ22R-B2P | I/O |
| 55 | SDQ29R-B2P | I/O | 56 | SDQ24R-B2P | I/O |
| 57 | 2R5-B2V | - | 58 | 2R5-B2V | - |
| 59 | SDQ28R-B2P | I/O | 60 | SDQ25R-B2P | I/O |

*Table C-22 Memory connector (200pin) (2/4)*

| Pin No. | Signal name | I/O | Pin No. | Signal name | I/O |
|---|---|---|---|---|---|
| 61 | SDQS3R-B2P | I/O | 62 | GND | - |
| 63 | GND | - | 64 | GND | - |
| 65 | SDQ27R-B2P | I/O | 66 | SDQ31R-B2P | I/O |
| 67 | SDQ26R-B2P | I/O | 68 | SDQ30R-B2P | I/O |
| 69 | 2R5-B2V | - | 70 | 2R5-B2V | - |
| 71 | SCB5B-B2P | I/O | 72 | SCB0B-B2P | I/O |
| 73 | SCB4B-B2P | I/O | 74 | SCB1B-B2P | I/O |
| 75 | GND | - | 76 | GND | - |
| 77 | SDQSBB-B2P | I/O | 78 | GND | - |
| 79 | SCB2B-B2P | O | 80 | SCB3B-B2P | O |
| 81 | 2R5-B2V | - | 82 | 2R5-B2V | - |
| 83 | SCB6B-B2P | O | 84 | SCB7B-B2P | O |
| 85 | N.C. | - | 86 | N.C. | - |
| 87 | GND | - | 88 | GND | - |
| 89 | 2R5-B2V | - | 90 | GND | - |
| 91 | GND | - | 92 | GND | - |
| 93 | 2R5-B2V | - | 94 | 2R5-B2V | - |
| 95 | SCKE3-B2P | O | 96 | SCKE2-B2P | O |
| 97 | N.C. | - | 98 | N.C. | - |
| 99 | SMA12-B2P | O | 100 | SMA11-B2P | O |
| 101 | SMA09-B2P | - | 102 | SMA08-B2P | - |
| 103 | GND | O | 104 | GND | - |
| 105 | SMA07-B2P | O | 106 | SMA06-B2P | O |
| 107 | SMA05-B2P | O | 108 | SMA04-B2P | O |
| 109 | SMA03-B2P | O | 110 | SMA02-B2P | O |
| 111 | SMA01-B2P | O | 112 | SMA00-B2P | O |
| 113 | 2R5-B2V | - | 114 | 2R5-B2V | - |
| 115 | SMA10-B2P | O | 116 | SBS1-B2P | O |
| 117 | SBS0-B2P | O | 118 | SRAS1-B2N | O |
| 119 | SWE-B2N | O | 120 | SCAS-B2N | O |
| 121 | SCS2-B2N | O | 122 | SCS3-B2N | O |
| 123 | N.C. | - | 124 | N.C. | - |

*Table C-22 Memory connector (200pin) (3/4)*

| Pin No. | Signal name | I/O | Pin No. | Signal name | I/O |
|---|---|---|---|---|---|
| 125 | GND | - | 126 | GND | - |
| 127 | SDQ32R-B2P | I/O | 128 | SDQ36R-B2P | I/O |
| 129 | SDQ37R-B2P | I/O | 130 | SDQ33R-B2P | I/O |
| 131 | 2R5-B2V | - | 132 | 2R5-B2V | - |
| 133 | SDQS4R-B2P | I/O | 134 | GND | - |
| 135 | SDQ35R-B2P | I/O | 136 | SDQ34R-B2P | I/O |
| 137 | GND | - | 138 | GND | - |
| 139 | SDQ39R-B2P | I/O | 140 | SDQ38R-B2P | I/O |
| 141 | SDQ40R-B2P | I/O | 142 | SDQ45R-B2P | I/O |
| 143 | 2R5-B2V | - | 144 | 2R5-B2V | - |
| 145 | SDQ44R-B2P | I/O | 146 | SDQ41R-B2P | I/O |
| 147 | SDQS5R-B2P | I/O | 148 | GND | - |
| 149 | GND | - | 150 | GND | - |
| 151 | SDQ47R-B2P | I/O | 152 | SDQ42R-B2P | I/O |
| 153 | SDQ46R-B2P | I/O | 154 | SDQ43R-B2P | I/O |
| 155 | 2R5-B2V | - | 156 | 2R5-B2V | - |
| 157 | 2R5-B2V | - | 158 | SCK4-B2N | O |
| 159 | GND | - | 160 | SCK4-B2P | O |
| 161 | GND | - | 162 | GND | - |
| 163 | SDQ53R-B2P | I/O | 164 | SDQ49R-B2P | I/O |
| 165 | SDQ52R-B2P | I/O | 166 | SDQ48R-B2P | I/O |
| 167 | 2R5-B2V | - | 168 | 2R5-B2V | - |
| 169 | SDQS6R-B2P | I/O | 170 | GND | - |
| 171 | SDQ55R-B2P | I/O | 172 | SDQ50R-B2P | I/O |
| 173 | GND | - | 174 | GND | - |
| 175 | SDQ51R-B2P | I/O | 176 | SDQ54R-B2P | I/O |
| 177 | SDQ61R-B2P | I/O | 178 | SDQ57R-B2P | I/O |
| 179 | 2R5-B2V | - | 180 | 2R5-B2V | - |
| 181 | SDQ50R-B2P | I/O | 182 | SDQ56R-B2P | I/O |
| 183 | SDQS7R-B2P | I/O | 184 | GND | - |
| 185 | GND | - | 186 | GND | - |
| 187 | SDQ59R-B2P | I/O | 188 | SDQ58R-B2P | I/O |

*Table C-22 Memory connector (200pin) (4/4)*

| Pin No. | Signal name | I/O | Pin No. | Signal name | I/O |
|---|---|---|---|---|---|
| 189 | SDQ63R-B2P | I/O | 190 | SDQ62R-B2P | I/O |
| 191 | 2R5-B2V | - | 192 | 2R5-B2V | - |
| 193 | SMBDAT-P3P | I/O | 194 | P3V | - |
| 195 | SMBCLK-P3P | I/O | 196 | GND | - |
| 197 | P3V | - | 198 | GND | - |
| 199 | N.C | - | 200 | N.C | - |

# FL Board

## C.23 PJ501 SC board I/F connector (13pin)

*Table C-23 SC board I/F connector (13pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal name | I/O |
|---|---|---|---|---|---|
| 1 | A4R7-P4V | - | 2 | MICIN-PXP | I |
| 3 | 25VREF-P2V | - | 4 | HPIN-P5P | I |
| 5 | A-GND | - | 6 | HEADR-PXP | O |
| 7 | A-GND | - | 8 | HEADL-PXP | O |
| 9 | A-GND | - | 10 | GND | - |
| 11 | GND | - | 12 | BTSWON-S3P | I |
| 13 | S3V | - | | | |

## C.24 PJ500 System board I/F connector (13pin)

*Table C-24 System board I/F connector (13pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal name | I/O |
|---|---|---|---|---|---|
| 1 | S3V | - | 2 | BTSWON-S3P | O |
| 3 | GND | - | 4 | GND | - |
| 5 | A-GND | - | 6 | HEADL-PXP | I |
| 7 | A-GND | - | 8 | HEADR-PXP | I |
| 9 | A-GND | - | 10 | HPIN-P5P | O |
| 11 | 25VREF-P2V | - | 12 | MICIN-PXP | O |
| 13 | A4R7-P4V | - | | | |

## HD Board

## C.25 PJ1 System board I/F connector (88pin)

*Table C-25 System board I/F connector (88pin)(1/2)*

| Pin No. | Signal name | I/O | Pin No. | Signal name | I/O |
|---|---|---|---|---|---|
| 1 | GND | - | 2 | GND | - |
| 3 | N.C. | - | 4 | N.C. | - |
| 5 | P3V | - | 6 | P3V | - |
| 7 | P3V | - | 8 | P3V | - |
| 9 | GND | - | 10 | P3V | - |
| 11 | N.C. | - | 12 | N.C. | - |
| 13 | GND | - | 14 | N.C. | - |
| 15 | HDDLED-P3N | O | 16 | N.C. | - |
| 17 | PDCS3-P3N | I | 18 | PDCS1-P3N | I |
| 19 | PDA2-P3P | I | 20 | PDA0-P3P | I |
| 21 | PDA1-P3P | I | 22 | GND | - |
| 23 | GND | - | 24 | GND | - |
| 25 | IRQ14-P3P | O | 26 | PDDACK-P3N | I |
| 27 | GND | - | 28 | PIORDY-P3P | O |
| 29 | GND | - | 30 | GND | - |
| 31 | GND | - | 32 | PDIOR-P3N | I |
| 33 | PDIOW-P3N | I | 34 | PDDREQ-P3P | O |
| 35 | GND | - | 36 | GND | - |
| 37 | GND | - | 38 | PDD15-P3P | I/O |
| 39 | PDD00-P3P | I/O | 40 | PDD14-P3P | I/O |
| 41 | PDD01-P3P | I/O | 42 | PDD13-P3P | I/O |
| 43 | GND | - | 44 | GND | - |
| 45 | GND | - | 46 | PDD02-P3P | I/O |
| 47 | PDD12-P3P | I/O | 48 | PDD03-P3P | I/O |
| 49 | PDD11-P3P | I/O | 50 | GND | - |

*Table C-25 System board I/F connector (88pin)(2/2)*

| Pin No. | Signal name | I/O | Pin No. | Signal name | I/O |
|---|---|---|---|---|---|
| 51 | GND | - | 52 | GND | - |
| 53 | PDD04-P3P | I/O | 54 | PDD10-P3P | I/O |
| 55 | PDD05-P3P | I/O | 56 | PDD09-P3P | I/O |
| 57 | GND | - | 58 | GND | - |
| 59 | GND | - | 60 | PDD06-P3P | I/O |
| 61 | PDD08-P3P | I/O | 62 | PDD07-P3P | I/O |
| 63 | IDRSTA-P3N | I | 64 | GND | - |
| 65 | GND | - | 66 | GND | - |
| 67 | N.C. | - | 68 | N.C. | - |
| 69 | MDC-B3V | I | 70 | MDC-B3V | I |
| 71 | M97SY2-P3P | I | 72 | M970T2-P3P | I |
| 73 | GND | - | 74 | M97IN2-B3P | O |
| 75 | X97BC2-P3P | I/O | 76 | M97RS2-S3N | I |
| 77 | GND | - | 78 | MDMP-BXP | O |
| 79 | GND | - | 80 | GND | - |

# C.26 PJ2 HDD I/F connector (44pin)

*Table C-26 HDD I/F connector (44pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal name | I/O |
|---|---|---|---|---|---|
| 1 | IDRSTA-P3N | O | 2 | GND | - |
| 3 | PDD07-P3P | I/O | 4 | PDD08-P5P | I/O |
| 5 | PDD06-P3P | I/O | 6 | PDD09-P5P | I/O |
| 7 | PDD05-P3P | I/O | 8 | PDD10-P5P | I/O |
| 9 | PDD04-P3P | I/O | 10 | PDD11-P5P | I/O |
| 11 | PDD03-P3P | I/O | 12 | PDD12-P5P | I/O |
| 13 | PDD02-P3P | I/O | 14 | PDD13-P5P | I/O |
| 15 | PDD01-P3P | I/O | 16 | PDD14-P5P | I/O |
| 17 | PDD00-P3P | I/O | 18 | PDD15-P5P | I/O |
| 19 | GND | - | 20 | N.C | - |
| 21 | PDDREQ-P3P | I | 22 | GND | - |
| 23 | PDIOW-P3N | O | 24 | GND | - |
| 25 | PDIOR-P3N | O | 26 | GND | - |
| 27 | PIORDY-P3P | I | 28 | CSEL-P3N | - |
| 29 | PDDACK-P3N | O | 30 | GND | - |
| 31 | IRQ14-P3P | I | 32 | N.C | - |
| 33 | PDA1-P3P | O | 34 | N.C | - |
| 35 | PDA0-P3P | O | 36 | PDA2-P3P | O |
| 37 | PDCS1-P3N | O | 38 | PDCS3-P3N | O |
| 39 | HDDLED-P3N | I | 40 | GND | - |
| 41 | P3V | - | 42 | P3V | - |
| 43 | GND | - | 44 | N.C | - |

## C.27 PJ3 MDC I/F connector (30pin)

*Table C-27 MDC I/F connector (30pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal name | I/O |
|---|---|---|---|---|---|
| 1 | N.C | - | 2 | GND | - |
| 3 | GND | - | 4 | MDMP-BXP | I |
| 5 | N.C | - | 6 | NC | - |
| 7 | N.C | - | 8 | GND | - |
| 9 | N.C | - | 10 | N.C | - |
| 11 | N.C | - | 12 | N.C | - |
| 13 | N.C | - | 14 | N.C | - |
| 15 | GND | - | 16 | MDC-B3V | - |
| 17 | MDC-B3V | - | 18 | N.C | - |
| 19 | GND | - | 20 | GND | - |
| 21 | N.C | - | 22 | M97SY2-P3P | O |
| 23 | M97OT2-P3P | O | 24 | N.C | - |
| 25 | M97RS2-S3N | O | 26 | M97IN2-B3P | I |
| 27 | GND | - | 28 | GND | - |
| 29 | GND | - | 30 | M97BC2-P3P | I/O |

## MI Board

## C.28 PJ1 System board I/F connector (100pin)(1/2)

*Table C-28 System board I/F connector (100pin) (1/2)*

| Pin No. | Signal name | I/O | Pin No. | Signal name | I/O |
|---|---|---|---|---|---|
| 1 | GND | - | 2 | GND | - |
| 3 | GND | - | 4 | PIRQD-P3N | I |
| 5 | N.C. | - | 6 | PCIRST-S3N | I |
| 7 | P3V | - | 8 | PGNT2-P3N | I |
| 9 | GND | - | 10 | PME-S3N | I/O |
| 11 | N.C. | - | 12 | AD30-P3P | I/O |
| 13 | P3V | - | 14 | AD28-P3P | I/O |
| 15 | AD26-P3P | I/O | 16 | AD24-P3P | I/O |
| 17 | MPCID-P3P | I/O | 18 | GND | - |
| 19 | AD22-P3P | I/O | 20 | AD20-P3P | I/O |
| 21 | PAR-P3P | | 22 | AD18-P3P | I/O |
| 23 | AD16-P3P | I/O | 24 | GND | - |
| 25 | FRAME-P3N | I/O | 26 | TRDY-P3N | I/O |
| 27 | STOP-P3N | I/O | 28 | P3V | - |
| 29 | DEVSEL-P3N | I/O | 30 | GND | - |
| 31 | AD15-P3P | I/O | 32 | AD13-P3P | I/O |
| 33 | AD11-P3P | I/O | 34 | GND | - |
| 35 | AD09-P3P | I/O | 36 | CBEO-P3N | I/O |
| 37 | P3V | - | 38 | AD06-P3P | I/O |
| 39 | AD04-P3P | I/O | 40 | AD02-P3P | I/O |
| 41 | AD00-P3P | I/O | 42 | GND | - |
| 43 | N.C. | - | 44 | B3V | - |
| 45 | B3V | - | 46 | B3V | - |
| 47 | N.C. | - | 48 | N.C. | - |
| 49 | P5V | - | 50 | P5V | - |

*Table C-28 System board I/F connector (100pin) (2/2)*

| Pin No. | Signal name | I/O | Pin No. | Signal name | I/O |
|---|---|---|---|---|---|
| 51 | GND | - | 52 | X33MPC-P3P | I |
| 53 | GND | - | 54 | WLON-S3N | I |
| 55 | PIRQA-P3N | I/O | 56 | PREQ2-P3N | O |
| 57 | AD31-P3P | I/O | 58 | GND | - |
| 59 | AD29-P3P | I/O | 60 | AD27-P3P | I/O |
| 61 | AD25-P3P | I/O | 62 | P3V | - |
| 63 | CBE3-P3N | I/O | 64 | AD23-P3P | I/O |
| 65 | GND | - | 66 | AD21-P3P | I/O |
| 67 | AD19-P3P | I/O | 68 | GND | - |
| 69 | AD17-P3P | I/O | 70 | CBE2-P3N | I/O |
| 71 | IRDY-P3N | I/O | 72 | GND | - |
| 73 | CLKRUN-P3N | I/O | 74 | SERR-P3N | I/O |
| 75 | P3V | - | 76 | PERR-P3N | I/O |
| 77 | CBE1-P3N | I/O | 78 | AD14-P3P | I/O |
| 79 | GND | - | 80 | AD12-P3P | I/O |
| 81 | N.C. | - | 82 | GND | - |
| 83 | N.C. | - | 84 | N.C. | - |
| 85 | P3V | - | 86 | AD10-P3P | I/O |
| 87 | AD08-P3P | I/O | 88 | GND | - |
| 89 | AD07-P3P | I/O | 90 | AD05-P3P | I/O |
| 91 | P3V | - | 92 | N.C. | - |
| 93 | GND | - | 94 | AD03-P3P | I/O |
| 95 | AD01-P3P | I/O | 96 | GND | - |
| 97 | GND | - | 98 | N.C. | - |
| 99 | P5V | - | 100 | P5V | - |

## C.29 PJ351 MINI PCI I/F connector (124pin)

*Table C-29 MINI PCI I/F connector (124pin) (1/2)*

| Pin No. | Signal name | I/O | Pin No. | Signal name | I/O |
|---|---|---|---|---|---|
| 1 | N.C | - | 2 | N.C | - |
| 3 | N.C | - | 4 | N.C | - |
| 5 | N.C | - | 6 | N.C | - |
| 7 | N.C | - | 8 | N.C | - |
| 9 | N.C | - | 10 | N.C | - |
| 11 | N.C | - | 12 | N.C | - |
| 13 | WLON-S3N | O | 14 | N.C | - |
| 15 | GND | - | 16 | N.C | - |
| 17 | PIRQA-P3N | I/O | 18 | P5V | - |
| 19 | P3V | - | 20 | PIRQD-P3N | O |
| 21 | N.C | - | 22 | N.C | - |
| 23 | GND | - | 24 | B3V | - |
| 25 | X33MPC-P3P | O | 26 | PCIRST-S3N | O |
| 27 | GND | - | 28 | P3V | - |
| 29 | PREQ2-P3N | I | 30 | PGNT2-P3N | O |
| 31 | P3V | - | 32 | GND | - |
| 33 | AD31-P3P | I/O | 34 | PME-S3N | I/O |
| 35 | AD29-P3P | I/O | 36 | N.C | - |
| 37 | GND | - | 38 | AD30-P3P | I/O |
| 39 | AD27-P3P | I/O | 40 | P3V | - |
| 41 | AD25-P3P | I/O | 42 | AD28-P3P | I/O |
| 43 | N.C | - | 44 | AD26-P3P | I/O |
| 45 | CBE3-P3N | I/O | 46 | AD24-P3P | I/O |
| 47 | AD23-P3P | I/O | 48 | MPCID-P3P | I/O |
| 49 | GND | - | 50 | GND | - |
| 51 | AD21-P3P | I/O | 52 | AD22-P3P | I/O |
| 53 | AD19-P3P | I/O | 54 | AD20-P3P | I/O |
| 55 | GND | - | 56 | PAR-P3P | I/O |

*Table C-29 MINI PCI I/F connector (124pin) (2/2)*

| Pin No. | Signal name | I/O | Pin No. | Signal name | I/O |
|---|---|---|---|---|---|
| 57 | AD17-P3P | I/O | 58 | AD18-P3P | I/O |
| 59 | CBE2-P3N | I/O | 60 | AD16-P3P | I/O |
| 61 | IRDY-P3N | I/O | 62 | GND | - |
| 63 | P3V | - | 64 | FRAME-P3N | I/O |
| 65 | CLKRUN-P3N | I/O | 66 | TRDY-P3N | I/O |
| 67 | SERR-P3N | I/O | 68 | STOP-P3N | I/O |
| 69 | GND | - | 70 | P3V | - |
| 71 | PERR-P3N | I/O | 72 | DEVSEL-P3N | I/O |
| 73 | CBE1-P3N | I | 74 | GND | - |
| 75 | AD14-P3P | I | 76 | AD15-P3P | O |
| 77 | GND | - | 78 | AD13-P3P | O |
| 79 | AD12-P3P | I | 80 | AD11-P3P | O |
| 81 | AD10-P3P | I | 82 | GND | - |
| 83 | GND | - | 84 | AD09-P3P | O |
| 85 | AD08-P3P | I | 86 | CBE0-P3N | O |
| 87 | AD07-P3P | I | 88 | P3V | - |
| 89 | P3V | - | 90 | AD06-P3P | O |
| 91 | AD05-P3P | I | 92 | AD04-P3P | O |
| 93 | N.C | - | 94 | AD02-P3P | O |
| 95 | AD03-P3P | I | 96 | AD00-P3P | O |
| 97 | P5V | - | 98 | N.C | - |
| 99 | AD01-P3P | I | 100 | N.C | - |
| 101 | GND | - | 102 | GND | - |
| 103 | N.C | - | 104 | GND | - |
| 105 | N.C | - | 106 | N.C | - |
| 107 | N.C | - | 108 | N.C | - |
| 109 | N.C | - | 110 | N.C | - |
| 111 | N.C | I | 112 | N.C | - |
| 113 | GND | - | 114 | GND | - |
| 115 | N.C | - | 116 | N.C | - |
| 117 | GND | - | 118 | GND | - |
| 119 | GND | - | 120 | GND | - |
| 121 | N.C | - | 122 | N.C | - |
| 123 | P5V | - | 124 | P3V | - |

## SC Board

## C.30 PJ999 FL board I/F connector (13pin)

*Table C-30 FL board I/F connector (13pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal name | I/O |
|---|---|---|---|---|---|
| 1 | A4R7-P4V | - | 2 | MICIN-PXP | O |
| 3 | 25VREF-P2V | - | 4 | HPIN-P5P | O |
| 5 | A-GND | - | 6 | HEADR-PXP | I |
| 7 | A-GND | - | 8 | HEADL-PXP | I |
| 9 | A-GND | - | 10 | GND | - |
| 11 | GND | - | 12 | BTSWON-S3P | O |
| 13 | S3V | - | | | |

## C.31 PJ997 Headphone connector (5pin)

*Table C-31 Headphone connector (5pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal name | I/O |
|---|---|---|---|---|---|
| 1 | GND | - | 2 | HEADL-PXP | O |
| 3 | HEADR-PXP | O | 4 | GND | - |
| 5 | HPIN-P5P | I | | | |

## C.32 PJ998 External Microphone connector (5pin)

*Table C-32 External Microphone connector (5pin)*

| Pin No. | Signal name | I/O | Pin No. | Signal name | I/O |
|---|---|---|---|---|---|
| 1 | GND | - | 2 | MICIN | I |
| 3 | REFV | - | 4 | REFV | - |
| 5 | N.C | - | | | |

# Appendix D Keyboard Scan/Character Codes

*Table D-1 Scan codes (set 1 and set 2) (1/4)*

| Cap No. | Keytop | Code set 1 | | Code set 2 | | | Note |
|---|---|---|---|---|---|---|---|
| | | Make | Break | Make | Break | | |
| 01 | ‘ ~ | 29 | A9 | 0E | F0 | 0E | |
| 02 | 1 ! | 02 | 82 | 16 | F0 | 16 | |
| 03 | 2 @ | 03 | 83 | 1E | F0 | 1E | |
| 04 | 3 # | 04 | 84 | 26 | F0 | 26 | |
| 05 | 4 $ | 05 | 85 | 25 | F0 | 25 | |
| 06 | 5 % | 06 | 86 | 2E | F0 | 2E | |
| 07 | 6 ^ | 07 | 87 | 36 | F0 | 36 | |
| 08 | 7 & | 08 | 88 | 3D | F0 | 3D | *2 |
| 09 | 8 * | 09 | 89 | 3E | F0 | 3E | *2 |
| 10 | 9 ( | 0A | 8A | 46 | F0 | 46 | *2 |
| 11 | 0 ) | 0B | 8B | 45 | F0 | 45 | *2 |
| 12 | - _ | 0C | 8C | 4E | F0 | 4E | |
| 13 | = + | 0D | 8D | 55 | F0 | 55 | |
| | | | | | | | |
| 15 | BkSp | 0E | 8E | 66 | F0 | 66 | |
| 16 | Tab | 0F | 8F | 0D | F0 | 0D | |
| 17 | Q | 10 | 90 | 15 | F0 | 15 | |
| 18 | W | 11 | 91 | 1D | F0 | 1D | |
| 19 | E | 12 | 92 | 24 | F0 | 24 | |
| 20 | R | 13 | 93 | 2D | F0 | 2D | |
| 21 | T | 14 | 94 | 2C | F0 | 2C | |
| 22 | Y | 15 | 95 | 35 | F0 | 35 | |
| 23 | U | 16 | 96 | 3C | F0 | 3C | *2 |
| 24 | I | 17 | 97 | 43 | F0 | 43 | *2 |
| 25 | O | 18 | 98 | 44 | F0 | 44 | *2 |
| 26 | P | 19 | 99 | 4D | F0 | 4D | *2 |
| 27 | [ { | 1A | 9A | 54 | F0 | 54 | |
| 28 | ] } | 1B | 9B | 5B | F0 | 5B | |

*Table D-1 Scan codes (set 1 and set 2) (2/4)*

| Cap No. | Keytop | Code set 1 | | Code set 2 | | | Note |
|---|---|---|---|---|---|---|---|
| | | Make | Break | Make | Break | | |
| 29 | \ \| | 2B | AB | 5D | F0 | 5D | *5 |
| 30 | Caps Lock | 3A | BA | 58 | F0 | 58 | |
| 31 | A | 1E | 9E | 1C | F0 | 1C | |
| 32 | S | 1F | 9F | 1B | F0 | 1B | |
| 33 | D | 20 | A0 | 23 | F0 | 23 | |
| 34 | F | 21 | A1 | 2B | F0 | 2B | |
| 35 | G | 22 | A2 | 34 | F0 | 34 | |
| 36 | H | 23 | A3 | 33 | F0 | 33 | |
| 37 | J | 24 | A4 | 3B | F0 | 3B | *2 |
| 38 | K | 25 | A5 | 42 | F0 | 42 | *2 |
| 39 | L | 26 | A6 | 4B | F0 | 4B | *2 |
| 40 | ; : | 27 | A7 | 4C | F0 | 4C | *2 |
| 41 | ‘ “ | 28 | A8 | 52 | F0 | 52 | |
| 43 | Enter | 1C | 9C | 5A | F0 | 5A | *3 |
| 44 | Shift (L) | 2A | AA | 12 | F0 | 12 | |
| 45 | No.102 key | 56 | D6 | 61 | F0 | 61 | |
| 46 | Z | 2C | AC | 1A | F0 | 1A | |
| 47 | X | 2D | AD | 22 | F0 | 22 | |
| 48 | C | 2E | AE | 21 | F0 | 21 | |
| 49 | V | 2F | AF | 2A | F0 | 2A | |
| 50 | B | 30 | B0 | 32 | F0 | 32 | |
| 51 | N | 31 | B1 | 31 | F0 | 31 | |
| 52 | M | 32 | B2 | 3A | F0 | 3A | *2 |
| 53 | , < | 33 | B3 | 41 | F0 | 41 | *2 |
| 54 | . > | 34 | B4 | 49 | F0 | 49 | *2 |
| 55 | / ? | 35 | B5 | 4A | F0 | 4A | *2 |
| 57 | Shift (R) | 36 | B6 | 59 | F0 | 59 | |

*Table D-1  Scan codes (set 1 and set 2) (3/4)*

| Cap No. | Keytop | Code set 1 Make | Code set 1 Break | Code set 2 Make | Code set 2 Break | Note |
|---|---|---|---|---|---|---|
| 58 | Ctrl | 1D | 9D | 14 | F0 14 | *3 |
| 60 | Alt (L) | 38 | B8 | 11 | F0 11 | *3 |
| 61 | Space | 39 | B9 | 29 | F0 29 | |
| 62 | ALT (R) | E0 38 | E0 B8 | E0 11 | E0 F0 11 | |
| 75 | Ins | E0 52 | E0 D2 | E0 70 | E0 F0 70 | *1 |
| 76 | Del | E0 53 | E0 D3 | E0 71 | E0 F0 71 | *1 |
| 79 | ← | E0 4B | E0 CB | E0 6B | E0 F0 6B | *1 |
| 80 | Home | E0 47 | E0 C7 | E0 6C | E0 F0 6C | *1 |
| 81 | End | E0 4F | E0 CF | E0 69 | E0 F0 69 | *1 |
| 83 | ↑ | E0 48 | E0 C8 | E0 75 | E0 F0 75 | *1 |
| 84 | ↓ | E0 50 | E0 D0 | E0 72 | E0 F0 72 | *1 |
| 85 | PgUp | E0 49 | E0 C9 | E0 7D | E0 F0 7D | *1 |
| 86 | PgDn | E0 51 | E0 D1 | E0 7A | E0 F0 7A | *1 |
| 89 | → | E0 4D | E0 CD | E0 74 | E0 F0 74 | *1 |
| 110 | Esc | 01 | 81 | 76 | F0 76 | |
| 112 | F1 | 3B | BB | 05 | F0 05 | |
| 113 | F2 | 3C | BC | 06 | F0 06 | |
| 114 | F3 | 3D | BD | 04 | F0 04 | |
| 115 | F4 | 3E | BE | 0C | F0 0C | |
| 116 | F5 | 3F | BF | 03 | F0 03 | |
| 117 | F6 | 40 | C0 | 0B | F0 0B | |
| 118 | F7 | 41 | C1 | 83 | F0 83 | |
| 119 | F8 | 42 | C2 | 0A | F0 0A | |
| 120 | F9 | 43 | C3 | 01 | F0 01 | |
| 121 | F10 | 44 | C4 | 09 | F0 09 | *3 |

*Table D-1 Scan codes (set 1 and set 2) (4/4)*

| Cap No. | Keytop | Code set 1 | | Code set 2 | | Note |
|---|---|---|---|---|---|---|
| | | Make | Break | Make | Break | |
| 122 | F11 | 57 | D7 | 78 | F0 78 | *3 |
| 123 | F12 | 58 | D8 | 07 | F0 07 | *3 |
| 124 | PrintSc | *6 | *6 | *6 | *6 | *6 |
| 126 | Pause | *7 | *7 | *7 | *7 | *7 |
| 202 | Fn | — | — | — | — | *4 |
| 203 | Win | E0 5B | E0 DB | E0 1F | E0 F0 1F | |
| 204 | App | E0 5D | E0 DD | E0 2F | E0 F0 2F | |

**Notes:**

1. * Scan codes differ by mode.
2. * Scan codes differ by overlay function.
3. * Combination with the **Fn** key makes different codes.
4. * **Fn** key does not generate a code by itself.
5. * This key corresponds to key No. 42 in a 102-key model.
6. * Refer to Table D-6, No. 124 key scan code.
7. * Refer to Table D-7, No. 126 key scan code.

*Table D-2 Scan codes with left Shift key*

| Cap No. | Key top | Code set 1 | | | | | | | | Code set 2 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Make | | | | Break | | | | Make | | | | | Break | | | | |
| 55 | / | E0 | AA | E0 | 35 | E0 | B5 | E0 | 2A | E0 | F0 | 12 | E0 | 4A | E0 | F0 | 4A | E0 | 12 |
| 75 | INS | E0 | AA | E0 | 52 | E0 | D2 | E0 | 2A | E0 | F0 | 12 | E0 | 70 | E0 | F0 | 70 | E0 | 12 |
| 76 | DEL | E0 | AA | E0 | 53 | E0 | D3 | E0 | 2A | E0 | F0 | 12 | E0 | 71 | E0 | F0 | 71 | E0 | 12 |
| 79 | ← | E0 | AA | E0 | 4B | E0 | CB | E0 | 2A | E0 | F0 | 12 | E0 | 6B | E0 | F0 | 6B | E0 | 12 |
| 80 | Home | E0 | AA | E0 | 47 | E0 | C7 | E0 | 2A | E0 | F0 | 12 | E0 | 6C | E0 | F0 | 6C | E0 | 12 |
| 81 | End | E0 | AA | E0 | 4F | E0 | CF | E0 | 2A | E0 | F0 | 12 | E0 | 69 | E0 | F0 | 69 | E0 | 12 |
| 83 | ↑ | E0 | AA | E0 | 48 | E0 | C8 | E0 | 2A | E0 | F0 | 12 | E0 | 75 | E0 | F0 | 75 | E0 | 12 |
| 84 | ↓ | E0 | AA | E0 | 50 | E0 | D0 | E0 | 2A | E0 | F0 | 12 | E0 | 72 | E0 | F0 | 72 | E0 | 12 |
| 85 | PgUp | E0 | AA | E0 | 49 | E0 | C9 | E0 | 2A | E0 | F0 | 12 | E0 | 7D | E0 | F0 | 7D | E0 | 12 |
| 86 | PgDn | E0 | AA | E0 | 51 | E0 | D1 | E0 | 2A | E0 | F0 | 12 | E0 | 7A | E0 | F0 | 7A | E0 | 12 |
| 89 | → | E0 | AA | E0 | 4D | E0 | CD | E0 | 2A | E0 | F0 | 12 | E0 | 74 | E0 | F0 | 74 | E0 | 12 |
| 203 | Win | E0 | AA | E0 | 5B | E0 | DB | E0 | 2A | E0 | F0 | 12 | E0 | 1F | E0 | F0 | 1F | E0 | 12 |
| 204 | App | E0 | AA | E0 | 5D | E0 | DD | E0 | 2A | E0 | F0 | 12 | E0 | 2F | E0 | F0 | 2F | E0 | 12 |

**Note :** The table above shows scan codes with the left **Shift** key. In combination with the right **Shift** key, scan codes are changed as listed below:

| | With left **Shift** | With right **Shift** |
|---|---|---|
| Set 1 | E0 AA ___________ | E0 B6 |
| | E0 2A ___________ | E0 36 |
| Set 2 | E0 F0 12 _________ | E0 F0 59 |
| | E0 12 ____________ | E0 59 |

*Table D-3 Scan codes in Numlock mode*

| Cap No. | Key top | Code set 1 Make | | | | Code set 1 Break | | | | Code set 2 Make | | | | Code set 2 Break | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 75 | INS | E0 | 2A | E0 | 52 | E0 | D2 | E0 | AA | E0 | 12 | E0 | 70 | E0 | F0 | 70 | E0 | F0 | 12 |
| 76 | DEL | E0 | 2A | E0 | 53 | E0 | D3 | E0 | AA | E0 | 12 | E0 | 71 | E0 | F0 | 71 | E0 | F0 | 12 |
| 79 | ← | E0 | 2A | E0 | 4B | E0 | CB | E0 | AA | E0 | 12 | E0 | 6B | E0 | F0 | 6B | E0 | F0 | 12 |
| 80 | Home | E0 | 2A | E0 | 47 | E0 | C7 | E0 | AA | E0 | 12 | E0 | 6C | E0 | F0 | 6C | E0 | F0 | 12 |
| 81 | End | E0 | 2A | E0 | 4F | E0 | CF | E0 | AA | E0 | 12 | E0 | 69 | E0 | F0 | 69 | E0 | F0 | 12 |
| 83 | ↑ | E0 | 2A | E0 | 48 | E0 | C8 | E0 | AA | E0 | 12 | E0 | 75 | E0 | F0 | 75 | E0 | F0 | 12 |
| 84 | ↓ | E0 | 2A | E0 | 50 | E0 | D0 | E0 | AA | E0 | 12 | E0 | 72 | E0 | F0 | 72 | E0 | F0 | 12 |
| 85 | PgUp | E0 | 2A | E0 | 49 | E0 | C9 | E0 | AA | E0 | 12 | E0 | 7D | E0 | F0 | 7D | E0 | F0 | 12 |
| 86 | PgDn | E0 | 2A | E0 | 51 | E0 | D1 | E0 | AA | E0 | 12 | E0 | 7A | E0 | F0 | 7A | E0 | F0 | 12 |
| 89 | → | E0 | 2A | E0 | 4D | E0 | CD | E0 | AA | E0 | 12 | E0 | 74 | E0 | F0 | 74 | E0 | F0 | 12 |
| 203 | Win | E0 | 2A | E0 | 5B | E0 | DB | E0 | AA | E0 | 12 | E0 | 1F | E0 | F0 | 1F | E0 | F0 | 12 |
| 204 | App | E0 | 2A | E0 | 5D | E0 | DD | E0 | AA | E0 | 12 | E0 | 2F | E0 | F0 | 2F | E0 | F0 | 12 |

*Table D-4 Scan codes with Fn key*

| Cap No. | Keytop | Code set 1 Make | | Code set 1 Break | | Code set 2 Make | | Code set 2 Break | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 43 | ENT | E0 | 1C | E0 | 9C | E0 | 5A | E0 | F0 | 5A |
| 58 | CTRL | E0 | 1D | E0 | 9D | E0 | 14 | E0 | F0 | 14 |
| 60 | LALT | E0 | 38 | E0 | B8 | E0 | 11 | E0 | F0 | 11 |
| 121 | ARROW | 45 | | C5 | | 77 | | F0 | 77 | |
| 122 | NUMERIC | 45 | | C5 | | 77 | | F0 | 77 | |
| 123 | Scrl | 46 | | C5 | | 7E | | F0 | 7E | |

*Table D-5 Scan codes in overlay mode*

| Cap No. | Keytop | | Code set 1 | | Code set 2 | |
|---|---|---|---|---|---|---|
| | | | Make | Break | Make | Break |
| 08 | 7 | (7) | 47 | C7 | 6C | F0 6C |
| 09 | 8 | (8) | 48 | C8 | 75 | F0 75 |
| 10 | 9 | (9) | 49 | C9 | 7D | F0 7D |
| 11 | 0 | (*) | 37 | B7 | 7C | F0 7C |
| 23 | U | (4) | 4B | CB | 6B | F0 6B |
| 24 | I | (5) | 4C | CC | 73 | F0 73 |
| 25 | O | (6) | 4D | CD | 74 | F0 74 |
| 26 | P | (–) | 4A | CA | 7B | F0 7B |
| 37 | J | (1) | 4F | CF | 69 | F0 69 |
| 38 | K | (2) | 50 | D0 | 72 | F0 72 |
| 39 | L | (3) | 51 | D1 | 7A | F0 7A |
| 40 | ; | (+) | 4E | CE | 79 | F0 79 |
| 52 | M | (0) | 52 | D2 | 70 | F0 70 |
| 54 | . | (.) | 53 | D3 | 71 | F0 71 |
| 55 | / | (/) | E0 35 | E0 B5 | 40 4A | E0 F0 4A |

*Table D-6 No.124 key scan code*

| Key top | Shift | Code set 1 | | Code set 2 | |
|---|---|---|---|---|---|
| | | Make | Break | Make | Break |
| Prt Sc | Common | E0 2A E0 37 | E0 B7 E0 AA | E0 12 E0 7C | E0 F0 7C E0 F0 12 |
| | Ctrl + | E0 37 | E0 B7 | E0 7C | E0 F0 7C |
| | Shift + | E0 37 | E0 B7 | E0 7C | E0 F0 7C |
| | Alt + | 54 | D4 | 84 | F0 B4 |

*Table D-7 No.126 key scan code*

| Key top | Shift | Code set 1 | Code set 2 |
|---|---|---|---|
| | | Make | Make |
| Pause | Common* | E1 1D 45 E1 9D C5 | E1 14 77 E1 F0 14 F0 77 |
| | Ctrl* | E0 46 E0 C6 | E0 7E E0 F0 7E |

*: This key generates only make codes.

# Appendix E Key Layout

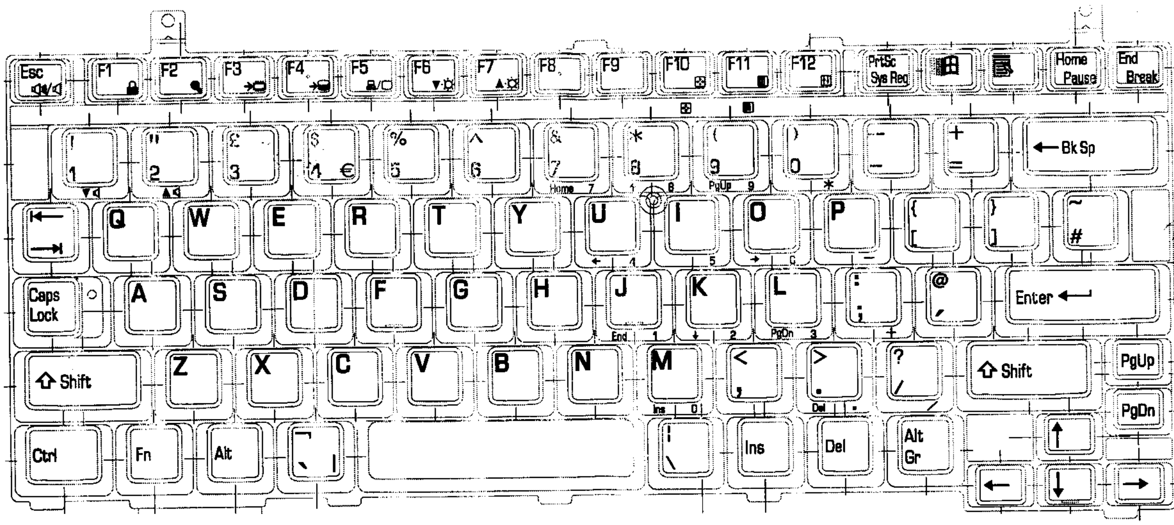


*Figure E-1 Key layout (UK)*

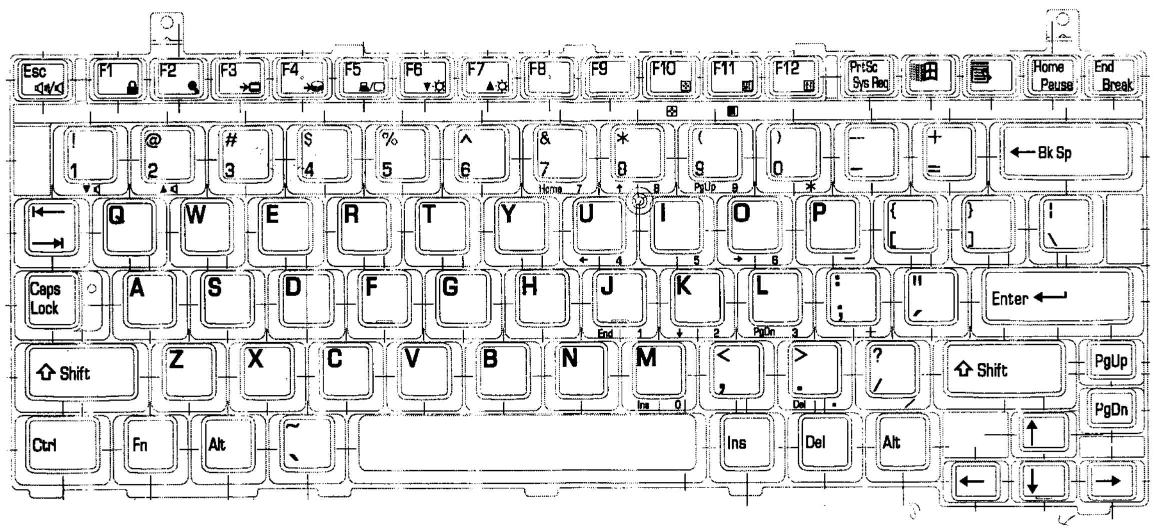


*Figure E-2 Key layout (US)*

# Appendix F BIOS/KBC/EC Update

When updating the BIOS and EC/KBC set floppy diskette including updated program into the floppy drive and turn on the computer while holding down following key.

- In case of updating the BIOS **F12**
- In case of updating the KBC/EC **Tab**

The power is automatically turned off as soon as the beep sound is heard and completion message is displayed when updating has been finished. Make sure with T&D whether updating has been done.

**Caution**

1) The power must not be turned off during the rewrite. If the write operation fails, the machine may not start up.

# Appendix G Reliability

The following table shows MTBF (Mean Time Between Failures) for each component.

*Table G-1 MTBF*

| Component | Time (hours) |
|---|---|
| System | 6,156.7 |

# Appendix H Key FD

This Appendix explains how to make a key FD.

1. Start the setup program.

2. Set the cursor to `Not Registered` of `PASSWORD` and press **Space** or **BackSpace** key. The screen to input the password appears.

   If the password has been set, `Registered` is displayed `PASSWORD` item. Then cancel the password first and set a new one.

3. Enter a password.
   The number of words shall be within ten. The character "*" is displayed as you enter a word.

4. Press **Enter** key.
   The first password is recognized and the second one is required.

5. Enter the second password.
   Enter the same password as the first one. . The character "*" is displayed as you enter a word.

6. Press **Enter** key.
   The password is registered. When the second password differs from the first one, the input of the password is required again. Then enter the password same as the first one.

7. When the password is set, press **Fn** + → keys. Then the following message appears.

```
Are you sure ? (Y/N)
The changes you made will cause the system to reboot.
Insert password service disk if necessary.
```

8. Insert a FD into the USB FDD and press **Y** key. Then the following message appears.

```
Password Service Disk Type ? (1:2HD,2:2DD)
```

   When the set FD is 2HD, press 1 key. For 2DD, press 2 key.

   The data is written to the FD. (If no FD is set, this procedure is finished.)

   When the wiring to the FD is completed, the following message appears.

```
Remove the password service disk, then press any key.
```

   Remove the FD and finish the procedure by pressing any key.